AGRICULTURAL CHEMICALS

In this issue:

October 1961

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your product as well as

DELIVER

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Your package is the "picture" of your product to your customers and prospects. To make the picture attractive Chase's Art Department is ready to help you design a brand to achieve just the right effect for your purpose. Skilled color printing craftsmen follow through to give you a bag that does a top selling job.

And to make your bag serve—longer and better—we insist on the finest bag materials available, bought in the open market and thus not limited to a single source. Our "kraftsmen" turn these into the toughest bags you ever put feed, seed, fertilizer, chemicals—or anything—into.

If you want bags that are designed to sell as well as made to serve, call your Chase Man. Or write us.

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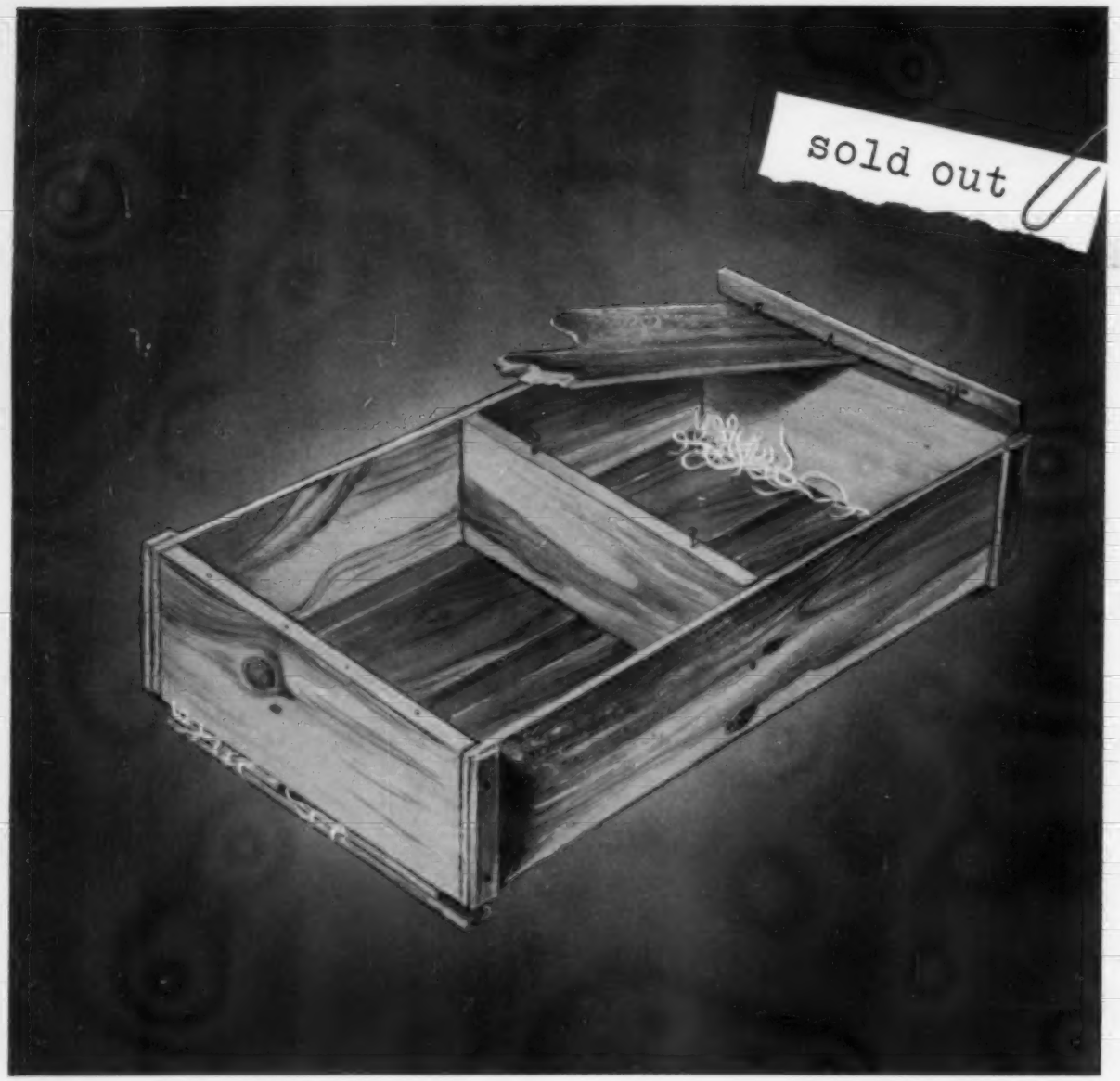

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When used in fertilizers, Triangle Brand Copper Sulfate helps to enrich the soil, resulting in healthy, profitable crops.

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This Month's Cover

"Fewer farms . . . but larger farms, producing more and consuming more of the products of industry." SUCCESSFUL FARMING *has prepared a film presentation entitled "Farming's New Face" that highlights the progress of American agriculture. See details on page 92.*

AG CHEM

Vol. 16, No. 10 October, 1961

ARTICLES

FEATURES

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SYMBOLS OF PLANT LIFE

A 20TH CENTURY SYMBOL FOR HIGHEST QUALITY POTASH

In the middle ages, working with little help from prior research, alchemists frequently developed materials by accident.

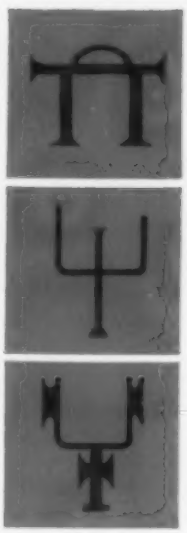
TODAY, MATERIALS ARE DEVELOPED BY PLAN TO MEET A NEED—JUST AS EACH TYPE OF HIGH-K MURIATE IS MADE TO MEET SPECIFIC REQUIREMENTS.

STANDARD HIGH-K MURIATE IS TAILOR MADE FOR CONVENTIONAL FERTILIZER MANUFACTURE AND VARIOUS RATIOS OF GRANULATED GRADES. IT FEATURES UNIFORM PARTICLE SIZE RANGE AND CHEMICAL ANALYSIS.

COARSE HIGH-K MURIATE IS USED IN THE MANUFACTURE OF CONVENTIONAL FERTILIZER AND IS ESPECIALLY USEFUL IN GRANULATION PLANTS. REASON: A CRYSTAL STRUCTURE WHICH DOES NOT BREAK DOWN WHEN ACIDS AND OTHER LIQUIDS ARE USED IN FORMULATION.

GRANULAR HIGH-K MURIATE IS A LARGER PARTICLE SIZE MURIATE FOR SPECIAL USE. SOUTHWEST POTASH PIONEERED THE PRODUCTION OF THIS ALL COMPACTED PRODUCT.

OUR PLANT PROCESSES ARE CONTINUALLY BEING MODERNIZED TO SUPPLY TYPES OF MURIATE NEEDED AND PREFERRED BY FERTILIZER MANUFACTURERS. ON SCHEDULE SHIPMENT, CAR AFTER CAR, DAY AFTER DAY, IS MAINTAINED THROUGHOUT THE YEAR.



Medieval alchemists' symbols for potash and cribbled ashes

SOUTHWEST POTASH CORPORATION

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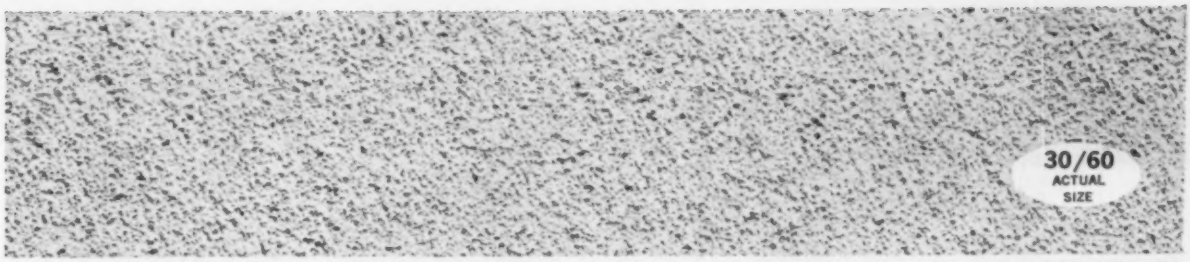
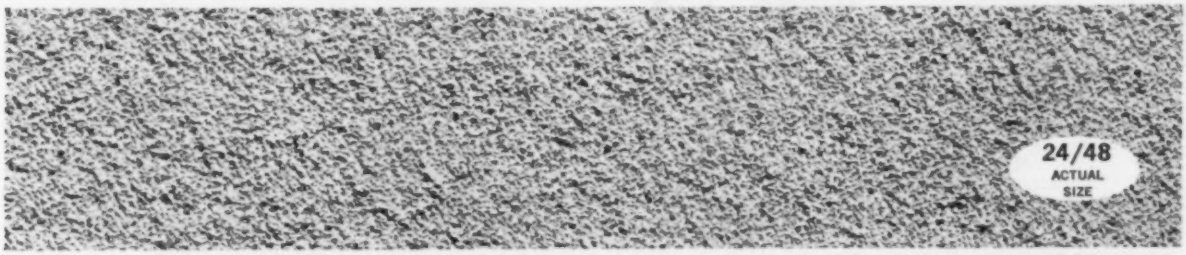


FLOREX* ATTAPULGITE CARRIERS GIVE YOU LOW DUST, UNIFORM SIZE AND HIGH SORPTIVITY



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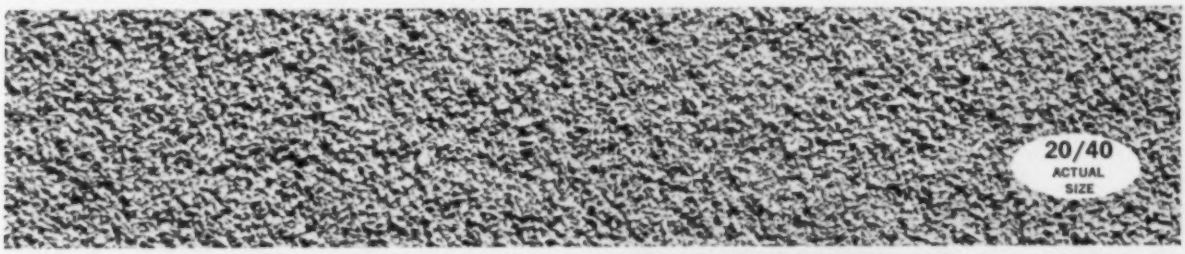

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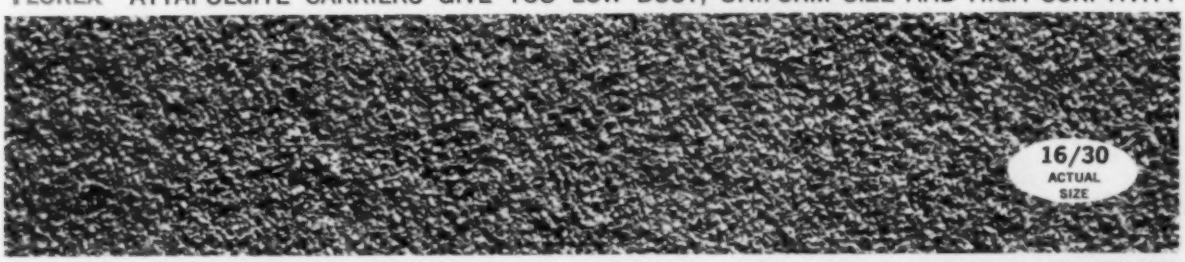

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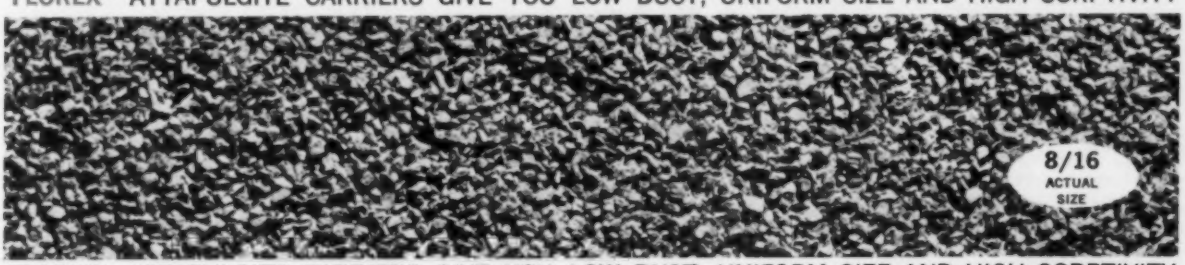

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*__FLOREX__ ATTAPULGITE CARRIERS ASSURE EASIER FORMULATION, MORE UNIFORM PESTICIDES AND THUS MORE UNIFORM FIELD APPLICATION

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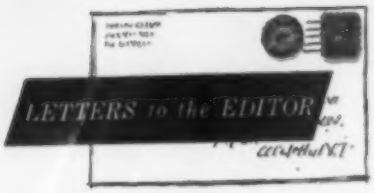


Local Dealers

To THE EDITOR:

Compliments are due for Al Chase's article, "Local Dealers are Vital to Effective Distribution Systems" (Aug. pg. 14). We concur with Mr. Chase with regard to the policies, management, and attitudes of some manufacturers, suppliers, and distributors. However, we are pleased to add that we know of some in this group who realize the importance of dealers, and who do more than is common to support and strengthen their dealers.

Each year, more and more customers realize that dependable local fast service and reliable up-to-date information are more and more important than a low price from a supplier on an estimated need that may turn out to be a surplus.

We need more of such articles, filled with constructive ideas rather than theoretical opinions.

George P. Lippincott
DORCHESTER FERTILIZER CO.
Cambridge, Md.

•

Dealer Schools

To THE EDITOR:

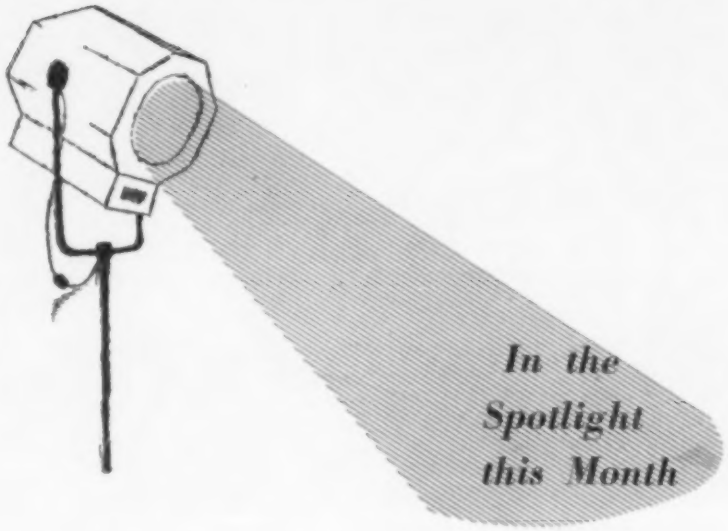
In the May issue of *Agricultural Chemicals*, the article on page 26, "Home Gardening Marketing Requires Qualified Dealers," was of particular interest to us.

The Garden Supply Dealer Educational Program not only is a commercial supplier's responsibility, but, in many urban counties, is a responsibility of the County Agricultural Agent. Cuyahoga County (Ohio) is an urban county with 1,700,000 population where commercial horticulture is of prime importance statewide. Part of the educational program here involves garden supply dealers. I was most interested in the workshop course for dealers sponsored by the Richmond Power Equipment Co., Richmond, Va.

Their program is quite extensive, with classes meeting one night a month to participate in practical courses of pruning, preparing lawns, and spraying. Our dealer schools have been conducted for the past four years. These are winter programs lasting three to four days. Extension specialists and research people from the Experiment Station, plus industry representatives, all cooperate with our planning committee to present an educational school for 60 or more dealers each year.

You are to be complimented for bringing this vital part of educating the dealer to the attention of other commercial agricultural chemical suppliers through your magazine.

Fred K. Buscher
EXTENSION AGENT,
AGRICULTURE
Cuyahoga County, Ohio



- **ACS Fertilizer Division** . . . The economics of bulk blending, a TVA process for granular diammonium phosphate, hydrophobic conditioners, and compost fertilizers are discussed in detail at the 140th National meeting of ACS. Page 14.

- **Carbamates** . . . A review of the introduction and use of carbamate insecticides discusses their action, the use of synergists, and commercial development. Also explored is resistance. Part one of a two-part report. Page 16.

- **Middle Management** . . . A study of the role of agricultural chemical division managers (middle management) indicates that this group is weakest in the area of solving problems. Page 18.

- **ACS Pesticide Symposium** . . . The need for a general analytical method that can be used quantitatively and qualitatively for detecting several pesticides in plants and animals is pointed up at the ACS meeting. Page 23.

- **Aquatic Weed Control** . . . Residents of a resort area in New York have banded together to provide chemical weed control for their lake, following a pilot weed-control project conducted by the state. Page 30.

- **Fertilizer Buying Habits** . . . Changes in agriculture are influencing farmers in their decisions about fertilizer use. An economist discusses the changes and tells how dealers can help farmers to maximize their profits. Page 39.

- **Dust Control** . . . The installation of a scrubber to reduce air pollution in a plant that produces crushed limestone, has warded off a possible community relations problem. Page 42.

WHAT'S NEW FROM IMC?

precision-sized granular potash

✔ Dust-free ✔ Uniform

✔ Won't crumble, settle-out in shipment!

In response to customer demand, IMC engineers have perfected a new, compact, precision-sized granular potash! Each granule is specially compacted and processed to produce superior cohesive strength — to prevent granule crumbling or breakdown in shipment, in mixing and handling.

This new potash material is precision manufactured to a new, improved screen size. It's dust-free, flows easily, won't bridge or pack. Delivering 60% K_2O minimum, this high-analysis potash is ideally suited for direct application . . . and contributes substantially to a more uniform mixed-goods formula. Result: you get superior physical characteristics *without* effecting chemical properties in your fertilizers or in the soil.

New IMC granular potash specification sheets and product samples are now available to you through your IMC representative.

Look to IMC for new and improved raw materials and for Full Orbit Services — designed to help you consolidate and *extend* your profit position.

A COMPLETE LINE OF IMC RAW MATERIALS

- Phosphate Rock
- Calcined Phosphate Rock
- Triple Superphosphate (coarse, granular, run-of-pile)
- Phosphoric Acid
- Muriate of Potash (coarse, standard, **new** precision-sized granular)
- Sulphate-of-Potash
- Sul-Po-Mag*

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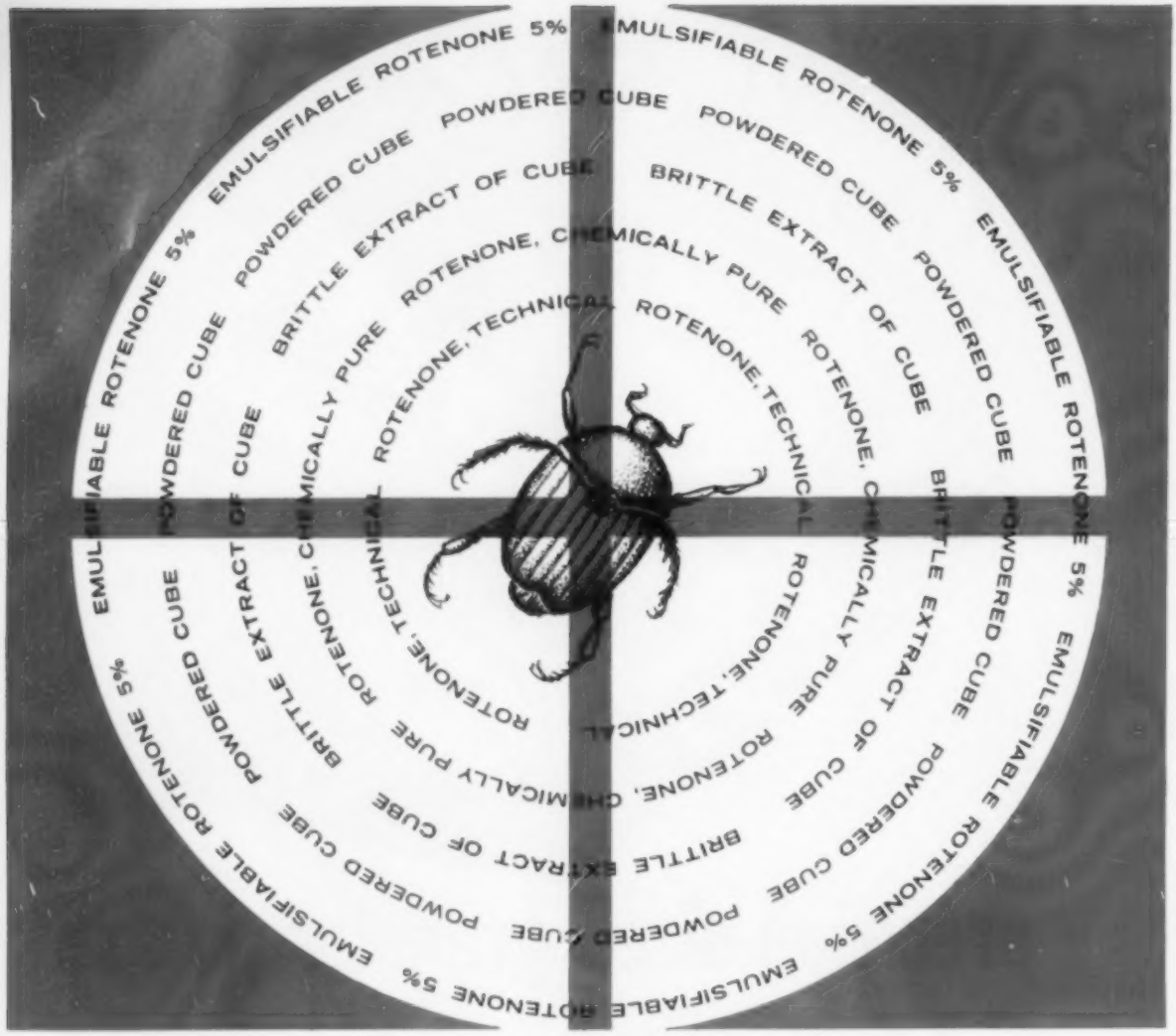

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Production and processing are entirely within our control, right back to natural sources, assuring extracts and concentrates with maximum activity and effectiveness.

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Now Chief Kay-Two-Oh can take time out to enjoy the Harvest Moon as he listens to the Indian Love Call with his Sweet Sioux — because he knows that it takes more than a moon, or even a medicine man, to bring in a good harvest.

Proper fertilizers are recognized in today's scientific farming methods as essential to producing bumper crops. The Chief is proud that the only business of Pee-Cee-A is supplying potash for these fertilizers. It's gratifying to have helped in the production of a bountiful harvest.

It's also gratifying to the Chief to feel that Pee-Cee-A offers the best service possible. If his scouts can be of service to *you*, let him know!

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PCA Standard 60% Muriate of Potash
PCA Coarse 60% Muriate of Potash
PCA Granular 60% Muriate of Potash
Potassium Chloride (99.9% KCL min.)
Sulphate of Potash

HE'S STARTING QUALITY PHOSPHATES YOUR WAY

He operates a high-pressure water gun at Cyanamid's Brewster, Florida, phosphate operation. He's one of several hundred Cyanamid people who mine, process, research, deliver and service phosphatic materials for your acidulation and mixed fertilizer business. These people put Cyanamid's more than 40 years of phosphate experience into products and services you can use.

As the giant dragline dumps just-mined phosphate ore, the operator directs a high-pressure stream of water onto the matrix to break it down to an easily-manageable slurry. The slurry collects in a "well" and is pumped through a pipeline to the washer plant. Slurry can be pumped efficiently over great distances, and thus helps make possible the manufacture of quality phosphate products in volume at reasonable cost.

Services you can use

Traffic Service: Cyanamid traffic specialists are ready to route and ship your orders without delays. Their knowledge can save you money, and can make your operation run even more efficiently.

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Sales Service: Cyanamid sales representatives are available to work with and for you in expanding present markets or in establishing new markets.

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Cyanamid's phosphate business is the mining and manufacturing of the highest quality products for your mixed fertilizer requirements.

- Florida Natural Phosphate Rock
- TREBO-PHOS® — Triple Superphosphate
- Phosphoric acid—an economical source of P_2O_5 for high-analysis fertilizers.

American Cyanamid Company, Agricultural Div., Princeton, New Jersey. *®TREBO-PHOS is American Cyanamid Company's trademark for its triple superphosphate.*

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PHOSPHATE PRODUCTS

CYANAMID SERVES THE MAN WHO MAKES A BUSINESS OF AGRICULTURE

EDITORIALS

IT seems to be increasingly popular nowadays for the public press to accuse the agricultural chemical industry of irresponsibility and the government of recklessness with regard to the use of pesticides. The *New York Times* last summer said, "We have yet to see an advertisement that pointed out to the potential user that birds are likely to be affected adversely when the chlorinated hydrocarbons or organic phosphate insecticides are sprayed on lawns, gardens or fields." The *Times* further stated that "no agency of the government is undertaking to educate the public about the hazards of misuse or about the hazards that sometimes exist even in use 'according to directions'."

This is a serious charge, especially when it is considered that the opinions of the *Times* are respected by its readers, most of whom are in no position to assess the soundness of these conclusions in terms of the facts.

An even more serious attack on pesticides appeared last month on the editorial page of the *Saturday Evening Post*. (see page 34). This editorial, which presumably was read by the Post's millions of readers all over the country, said "the indiscriminate use of certain insecticides in recent years is disturbing." In addition, the headline for the editorial warned against the use of pesticides by "zealots."

We take issue with the *Post* in this instance not because they reported unfavorably on pesticide use, but because they apparently made no effort to obtain both sides of the story, nor to present an unbiased report. In fact, the only "authority" quoted by the *Post* is a professor of zoology, Dr. George J. Wallace, who is a known critic of insecticides. This is the same Dr. Wallace who was quoted by *Sports Illustrated* (May 2, 1960) in their unfavorable report on pesticides (see *Agricultural Chemicals*, June, 1960, page 86).

Being in the publication business ourselves, we know from experience that when a publication is trying to present an unbiased account about any controversial subject, the accepted procedure is to contact recognized authorities from *both* sides. The *Post* did not to this. They selected as their authority a man with a known bias against pesticides, and made no attempt to give equal, or any attention for that matter, to the pesticide industry's side of the question.

Had they wanted to present a fair and unbiased account, they might well have included such statements as the one made last year by the Department of Fish and Game Management of the State of California which held that pesticides are only a minor influence in nature when compared to other factors in land and water development and use. Urbanization, industrial pollution, drainage of marshlands, cultivation—all constitute greater hazard to wildlife survival than chemical use, the California department explained.

We note that the *Saturday Evening Post* has recently made extensive revisions in its format, and now plans to take an active role in the task of enlightening the American people. We wish them every success, but, if their pesticide editorial is a sample of things to come, we are afraid that the goal may be a long way off.

Bulk Blending, DAP, Conditioners Are ACS Fertilizer Division Topics

A combination of high concentrations and low operating and distributing costs gives bulk-blended fertilizers a price advantage over both liquid and chemically-processed granular fertilizers. Also to be considered, however, when deciding on production facilities, are convenience and ease of application, flexibility in plant food ratios, and handling and storage properties.

BULK-BLENDED fertilizer usually costs 20-30¢ (per unit of plant food) less to produce than either liquid or chemically processed granular fertilizer, N. D. Spencer of TVA, told members of the ACS, Fertilizer and Soil Chemistry Division, at the annual meeting, held September 3-8 in Chicago. Mr. Spencer made this statement on the basis of a study conducted by himself, Julius Silverberg and J. R. Douglas, Jr., (all of TVA) comparing costs of liquid, bulk-blended and granulated mixed fertilizer. The price edge for bulk products was attributed to a combination of high concentrations and low operating and distribution costs, rather than cost of raw materials.

Mr. Spencer hastened to point out, however, that the lower price for producing bulk fertilizers should not be singled out as the major factor in deciding on production facilities. "Many times a certain property of a fertilizer will outweigh its price handicap," he observed. For example, convenience and ease of application, flexibility in plant food ratios that can be produced, better handling and storage properties – are all important considerations.

Mr. Spencer indicated that TVA has received many requests for cost comparison data on the various fertilizer production plants, and thus decided on the comparison study. Table 1 illustrates the basis of the comparison. Plants were assumed to be located in Minnesota, Iowa, Missouri, Tennessee and Georgia. Costs were estimated, for raw materials and their processing, sales expense and profit or return on capital employed, etc. For chemical process plants, cost of shipping from plant to distribution station and of operating the stations is included. Production costs, exclusive of raw materials are shown in Table 2. As can be seen, total production costs for a chemical processing plant averaged $20 per ton, compared with $10 for liquids and $9 for bulk blended fertilizers.

Table 3 gives a comparison of unit production costs by fertilizer grade.

In the granulation plant, costs range from 41 cents to 57 cents per unit of plant food (excluding raw material cost). The lowest cost is for the 10-20-20 grade, containing 50 units of plant food, and the highest cost for the least concentrated grade, 12-12-12. Cost range for the liquid plant is 31¢ to 48¢ and for the bulk blending plants, 14¢ to 17¢.

Total per unit costs for all three types of fertilizer jump up to $1.10 to $2.00, however, when raw materials and plant location enter the picture. Still, bulk-blended fertilizer maintains its economic advantage in all cases.

Mr. Spencer emphasizes that he doesn't expect the estimates presented to hold for all cases, but in checking the costs with those of some on-stream plants, he finds they are good "ball park figures."

A TVA Process For Granular Diammonium Phosphate

A new TVA process for DAP uses anhydrous ammonia and phosphoric acid in a continuous ammoniator granulator. Low recycle of 2½ pounds per pound of product is possible in making 18-46-0 and 21-53-0.

"HIGH analysis ammonium phosphate fertilizers are becoming more in demand as the trend toward production of higher analysis grades increases and as bulk blending increases in popularity," reported R. D. Young, TVA. He noted that shipment of ammonium phosphates in 1960-61 by primary producers were estimated at about 300,000 tons, or 28% over 1959-1960, and that additional plant expansion is underway or planned.

Mr. Young made the above observations in the course of presenting a paper on a "TVA Process for production of granular diammonium phosphate," prepared by himself and co-authors G. C. Hicks, and C. H. Davis, all of TVA. The

process described, can be carried out in a conventional ammoniation-granulation plant with only minor additional equipment, a preneutralizer tank and an ammonia scrubber. Raw materials include anhydrous ammonia and wet process or electric furnace phosphoric acid. The recycle requirement for 18-46-0 and 21-53-0 grades is only about 2.5 pounds per pound of product, — this relatively low level is possible because advantage is taken of the change in solubility of ammonium phosphate with NH_3: H_3PO_4 mole ratio.

Table 1.

Granular Chemical Processing Plant	Liquid Fertilizer	Bulk-Blend
$600,000 plant	$50,000 plant	$40,000
50,000 tons/year	5,000 tons/year	5,000 tons/year
20-25 tons/hour	batch operation	1-ton rotary mixer
	5-ton reactor	
Conventional raw materials used in plants		
ammonia solution	electric furnace acid	conc. superphosphate
superphosphate	urea	solid urea
sulfuric acid	or urea ammonium	18-46-0 DAP
18-46-0 DAP in	nitrate soln	
two formulations		

Table 2. Production Costs, Exclusive of Raw Materials

	Chemical Process	Liquid	Bulk Blend
	$/Ton		
Plant Operation			
Labor, clerical, etc.	1.90	1.05	1.05
Maintenance	.72	.60	.48
Utilities, Laboratory	.49	.17	.10
Taxes, Insurance	.24	.20	.16
Depreciation and other costs	.86	1.00	.80
Interest	.90	.75	.60
Overhead	1.44	.83	.76
Total	6.55	4.60	3.95
Return on Investment	3.75	2.50	2.00
Sales	3.00	3.00	3.00
Freight to distribution points	5.00	—	—
Distribution	2.16	—	—
	20.46	10.10	8.95

Table 3. Unit Production Costs By Fertilizer Grade (Exclusive of Raw Material)

1-1-1	.57 (12-12-12)	.37 (9-9-9)	.15 (19-19-19)
1-2-1	.51 (10-20-10)	.31 (8-16-8)	.14 (15-30-15)
1-3-3	.49 (6-18-18)	.48 (3-9-9)	.15 (9-27-27)
2-1-1	.51 (20-10-10)	.36 (14-7-7)	.17 (26-13-13)
1-2-2	.41 (10-20-20)	.40 (5-10-10)	.15 (12-24-24)

The process involves partial ammoniation of the acid in a preneutralizer and completion of the ammoniation in the ammoniator-granulator drum. Granulation is controlled by recycling product fines to the drum. Excess ammonia used as a driving force in the drum to ammoniate the material to diammonium phosphate (NH_3:H_3PO_4 mole ratio of 2.0) is recovered by scrubbing the exhaust gases with the feed acid before it enters the preneutralizer. Material from the ammoniator-granulator is dried and then screened to obtain a closely sized product. Straight diammonium phosphate of 18-46-0 grade was produced with wet-process acid and 21-53-0 was produced with electric-furnace acid. Several N-P-K grades, such as 18-18-18 and 14-35-14, were produced without difficulty by adding other feed materials.

Mr. Young indicated that at least three new commercial-scale plants have already been built to use this process, and that others are considering it in their plans for entering the rapidly expanding market for granular ammonium phosphates.

New Fatty Conditioners

Armflo — A new Conditioner . . . Fatty anti-caking agents are reported to feature dust control properties and act as corrosion inhibitors.

MOISTURE adsorption control in fertilizer manufacture by means of a mono-molecular, hydrophobic film covering the particle surface, using fatty amines as the active agent, was described by Scott S. Chandler, Armour Industrial Chemical Co. The new anti-caking agents developed by Armour are called Armoflo's. Early work and more recent plant testing indicates the necessity for heat in the pellet, and in the Armoflo, and adequate mixing to accomplish thorough spreading and coating. Mr. Chandler reports that plant testing and commercial usage has

(Continued on Page 82)

Part 1 of a 2 Part Report

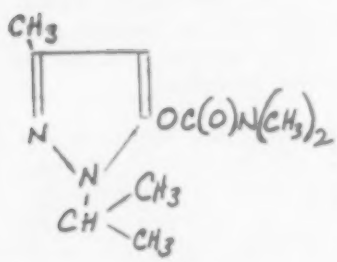
The Introduction And Use Of Carbamate Insecticides

The fact that a carbamate is a good antichlolinesterase does not imply that it is a good insecticide. An important factor is ionization: if the carbamate is ionic or strongly basic, it is not insecticidal, because the insect has all its vital anticholinesterase protected from ions.

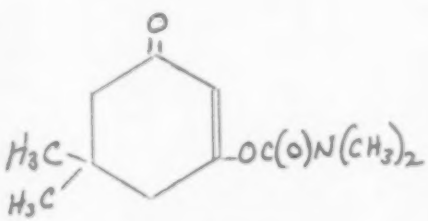
This report covers literature reviewed through February 1961. The authors wish to point out that the results of 1961 summer experimental and commercial use are not included.

by R. D. O'Brien and J. G. Matthysse
Associate Professor and Professor of Entomology
Cornell University, Ithaca, N. Y.

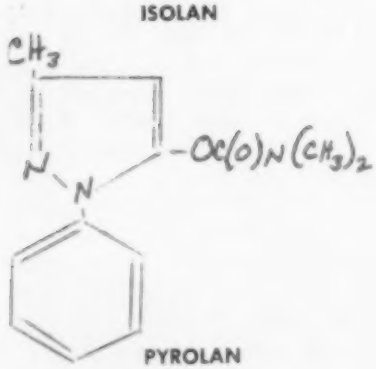
THE carbamates are derivatives of carbamic acid, $HOC(O)NH_2$. They have the general formula $XOC(O)NR_2$, where X is almost invariably a ring or rings, although these may be of very varied types. In a few cases, XO is replaced by a halogen such as Cl or F. As for the NR_2 group, the early Geigy compounds were all $N(CH_3)_2$, but most of the newer experimental compounds have $NM(CH_3)$. The formulae of four wellknown carbamates are:



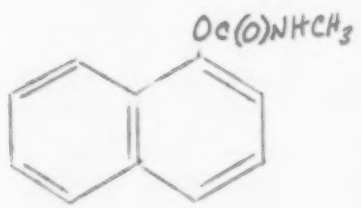
ISOLAN



DIMETAN

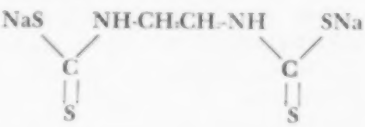


PYROLAN



SEVIN

The carbamates are chemically related to the well-known fungicides, the dithiocarbamates, but here the resemblance ends. The dithiocarbamates have potencies and modes of action totally unlike the carbamates. A typical dithiocarbamate is nabam:



Action

The carbamates are believed to owe their action to their ability to inhibit the enzyme cholinesterase. This enzyme is present in several tissues, but is important only in the nervous system. Inhibition of nerve cholinesterase destroys the effectiveness of the nervous system, and death ensues. The carbamates, therefore, are nerve poisons.

The other well-known cholinesterase inhibitors are the organic phosphorus insecticides, such as TEPP and DDVP, which attack cholinesterase by combining with it chemically, yielding a phosphorylated enzyme. It is not certain whether all the carbamates react in an analogous way. In some cases there is clear evidence that chemical reaction occurs, yielding a carbamoylated enzyme. (1). If we consider a hydroxyl on the enzyme E, the reaction is:

E-OH + XO-C(O)NR_2
Cholinesterase + Carbamate
E-O-C(O)NR_2 + XOH
Carbamoylated cholinesterase

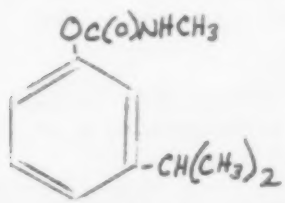
Previous authors presented evidence that this reaction does

not occur with most compounds, and that the carbamate complexes with the cholinesterase, without reacting chemically with it (2,3,4). Their evidence is, however, indirect, and not extremely convincing.

The fact that a carbamate is a good anticholinesterase does not imply that it is a good insecticide. An important factor is ionization: if the carbamate is ionic or strongly basic (so that it is ionized under physiological conditions), it is not insecticidal (2,5,6), because the insect has all its vital cholinesterase protected from ions. Unfortunately, the best carbamate anticholinesterases are ionized, and, therefore, not insecticidal. However, even if one excludes ionic or ionizable carbamates, the correlation between insect toxicity and anticholinesterase activity is very poor (2,4). Probably the cause is that so many carbamates can be degraded by the insect, and where degradation is rapid, the compound has low toxicity, even though the anticholinesterase activity of the undegraded material is extremely good (7).

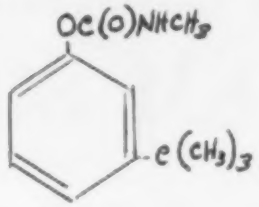
Resistance

Moorfield (8) has described extensive studies on carbamate resistance. Laboratory selection of house flies has induced resistance in every case, but the extent varied greatly. With compound I, 3-isopropylphenyl N-methylcarbamate,



I
(Hercules AC5727 or Union Carbide 10854)

and Pyrolan, development of resistance was relatively slow, but with compound II, 3-*tert* butylphenyl N-methylcarbamate, and Sevin, development was explosive, and in 10 generations the compounds were non-toxic.



II

It is remarkable that with compounds as similar chemically as I and II, the results should be so different. Moorefield points out that resistance develops quickest when the carbamate is not very potent against the insect initially and resistance is unimportant when the carbamate is initially potent. For instance, Sevin is very toxic to the Mexican bean beetle, and in 15 generations of selection, no resistance developed.

Resistance to carbamates is produced by selection with other insecticides. For instance, selection of house flies with the organophosphate Diazinon increased the LD_{50} of Isolan 14-fold, of Pyrolan 10-fold and Sevin over 37-fold (9). However, these flies were from a field source which had been treated with Pyrolan and methoxychlor five years earlier. Selection of a laboratory strain of house flies with DDT increased the LD_{50} of Isolan and Pyrolan 2-fold and Sevin over 18-fold (8).

Resistance to non-carbamate insecticides may be induced by selection with carbamates, but the effect is, in most cases, small unless the insects have a prior history of exposure to non-carbamates. For instance, selection by Sevin of an uncontaminated house fly strain did not increase resistance to DDT or Diazinon (8); but selection by phenyl N-dimethylcarbamate of a DDT-tolerant strain soon induced high resistance to DDT (10). Other workers (11) showed small resistance to organophosphates induced by Isolan selection of house flies: the maximum effect was a 5-fold increase in LD_{50} for Diazinon. However, these studies also showed an enormous increase in lindane resistance (1000-fold) caused by Isolan selection even though the effects on DDT, methoxychlor or Prolan susceptibility were very small.

Previous application of dithiocarbamate fungicides should have no bearing on development of resistance to carbamate insecticides. Resistance to Sevin in crop insects will more likely be due to previous exposure to organophosphorus insecticides.

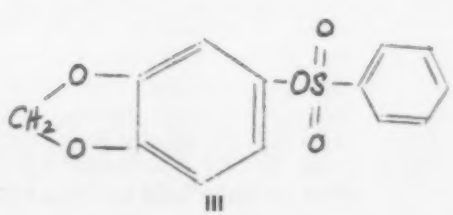
Synergism

The use of synergists can help by making a little insecticide go a long way; and is sometimes proposed as an answer to resistance.

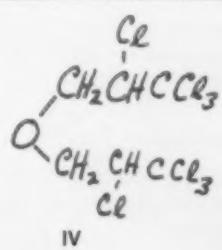
Moorefield (12) first showed that carbamates can be synergised by the compounds commonly employed as pyrethrin synergists: piperonyl butoxide, sesamex, sulfoxide, n-propyl isome, and sesamin oil extractives, used with both baits and sprays. Piperonyl butoxide decreased the LD_{50} of Sevin to house flies about 15-fold, and also eliminated an undesirable feature of Sevin's fly-killing ability: it is impossible to obtain higher than 80% mortality, however much Sevin is applied. Synergism was also found with cockroaches and bean aphids.

California workers have shown that sesamex and 3,4-methylene-

(*Continued on Page* 83)



III



IV

Personal Judgment Important

PROBLEM SOLVING: Middle Management's Failure

Although most companies clearly define the areas for which middle management has responsibility, there still are a number of complaints voiced against top management by this group. It is felt, generally, that the top management of most agricultural chemical companies is too remote, and there is not enough communication with middle management.

by E. S. Heckathorn

"OUR middle management does an excellent sales and production job, but when it comes to solving a problem or making a decision on something out of the ordinary, they seem to make the wrong one every time," so says a general manager of an agricultural chemical company.

"The middle management group asks for help when they have a problem, then won't use it when they get it," says another general manager.

The development and training of middle management in industry is as complex as the number of managers required. No longer can training be accomplished by "canned" or prepared schooling. The manager's personal judgment and interpretation are as important in decision making as fact and policy.

Definitions

Problem solving is defined as a question that is proposed for solution.

Agricultural chemical division managers (middle management) can be defined as managers in charge of sales and production in a given area with total profit responsibility.

"The development and training of middle management in industry is as complex as the number of managers required. No longer can training be accomplished by "canned" or prepared schooling. The manager's personal judgment and interpretation are as important in decision making as fact and policy."

E. S. Heckathorn
Management Consultant
Richmond, California

From *Managing Geographically Decentralized Companies* we find this description:

"LOCAL MANAGER OR DIVISION MANAGER—It is his mission to carry out the company's policies at the point of operation. He takes orders and he gives orders. He also receives some advice in some instances, and he has to decide what advice to take and what to ignore.

"To do these things, he must enjoy taking action and making day-to-day decisions. It must not bother him either to receive orders or to give them. He must be willing to put pressure on people. He must be able to give and to receive advice and criticism. He must remain unperturbed by the confusions that almost always result from the fact that in the home office he has at least one boss and several advisers. He must have the insight and the courage to depart from rules when circumstances warrant. He must be able to manage people—to lead and to coordinate the members of an organization. And he must be willing to run interference for his own subordinates when they need it."

Middle Management Decision Making Responsibility

Judgment by division management is required in many areas such as:

1. Sales
   - A. Selection of customers
   - B. Receptiveness to customers' needs
   - C. Timing of use of product
   - D. Type of product to be used
   - E. Legal and liability responsibilities
   - F. Credit
2. Management of time of subordinates as well as his own
3. Production responsibilities — what to produce and when
4. Inventory—turnover

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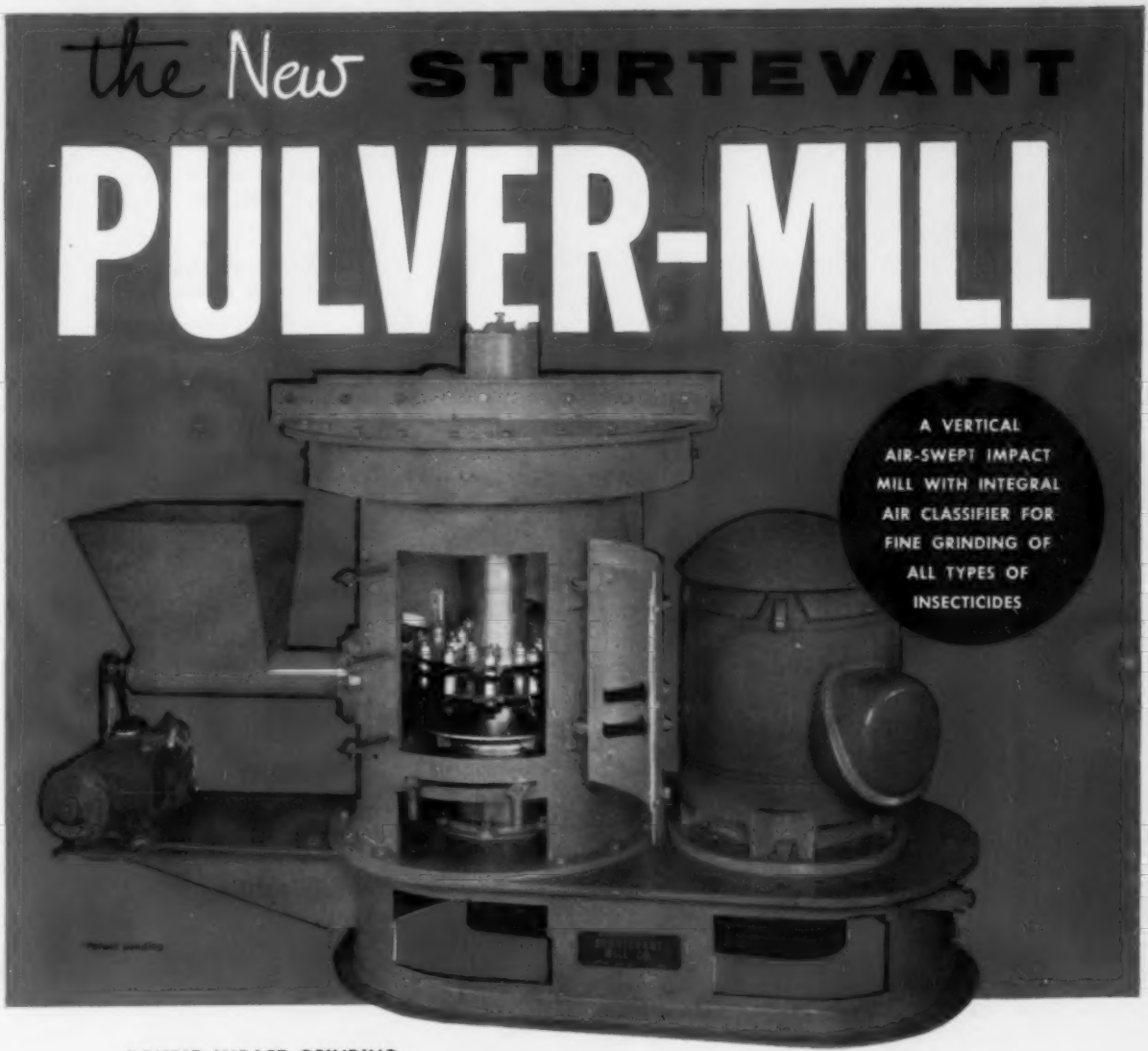

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5. Selection and training of subordinate personnel

Responsibilities in each of these areas of activity differ greatly in various companies in the agricultural chemical field but, generally, the following chart describes the decentralization and the responsibilities of typical middle management:

Decentralization and Responsibilities of Middle Management

	Staff or Top Management Main Office	*Division Manager*
Accounting:		
General Ledger	X	None
Accounts Receivable	X	Invoicing
Accounts Payable	X	Approval
Payroll	Completes	Time Cards
Credit	X	Suggest
Collection	If division fails	X
Purchasing:		
Raw Materials	X	Emergency
Finished Product	X	Requisition privilege
Stock Control:	Review	X
Ordering Material	Review	X
Sales:		
Customer Selection	Review and Suggest	X
Product Choice	Review and Suggest	X
Price of Sale	X	Suggest
Personnel:		
Hiring Key People	X (Key People)	Suggest
Firing	X	X (Labor)
Wages	X (Key People)	Suggest
Training	X	X
Product Lines & Services	X	Suggest
Engineering & Equipment	X	Suggest
Manufacturing	Review	X
Quality Control Formulation	X	Suggest
Profits	X	X

(X—Decision responsibility)

Middle Management's Complaints

Although most companies clearly define the areas for which middle management has responsibility, there still are a number of complaints voiced against top management by this group. It is generally felt that the top management of most agricultural chemical companies is too remote, and there is not enough communication with middle management. Most division managers feel they are not completely in tune with the latest management thinking or philosophy of operation. Most middle management also feels the supervision of their activities is not adequate and they are actually "lonesome." Some requested "handholding" more than help in making decisions. In some cases, the manager is more customer-oriented than company-oriented. The more sincere the desire to aid the customer, the greater the conflict with the company can become. The problem is further complicated by the fact that growth of the industry has forced companies into using men of few years experience in business as middle management.

Therefore, decision making is a definite problem to most middle management and their problem solving ability is questionable. Neither they nor top management are satisfied. When questioned, their response was often disorganized but expressed the following:

1. Lacked confidence in his own judgment.

2. Lacked confidence in his own reasoning ability

3. Felt his background and training were primarily technical, not in business, and thereby felt inadequate

4. Did not clearly understand company policy and could not see the total company problem

5. Considered immediately his own personal risk because of the above factors

Weakness in Problem Solving Procedure as Presently in Use

"Here's the solution, now what's your problem?" The tendency of all groups is to arrive at a solution before adequate problem analysis. Most of the time the solution was excellent but, unfortunately, for the wrong problem. Questioning decisions made by this group has resulted in the frequent expression of the following words: "I didn't think of that," or "I didn't know this before I made up my mind."

Most middle management has a tendency to over-complicate the problem and to over-simplify the solution into simple cause and effect relationships. Even after decision there was hesitation and faulty execution because of lack of confidence in their decision.

Suggested Procedure for Problem Solving

There are many ways to tackle problems. Here is one possible way, submitted as a pattern only, to help middle management solve problems and come to correct decisions.

I. Problem Analysis

Since fact finding is quite tedious, thus it is often short-circuited. Details, unfortunately, make solutions. Without proper analysis of the problem, the solver has to use assumption rather than fact. The odds of the assumption being correct are poor.

Probably the hardest part of problem solving is to refrain from arriving at a solution before all these facts are dis-

(*Continued on Page* 84)

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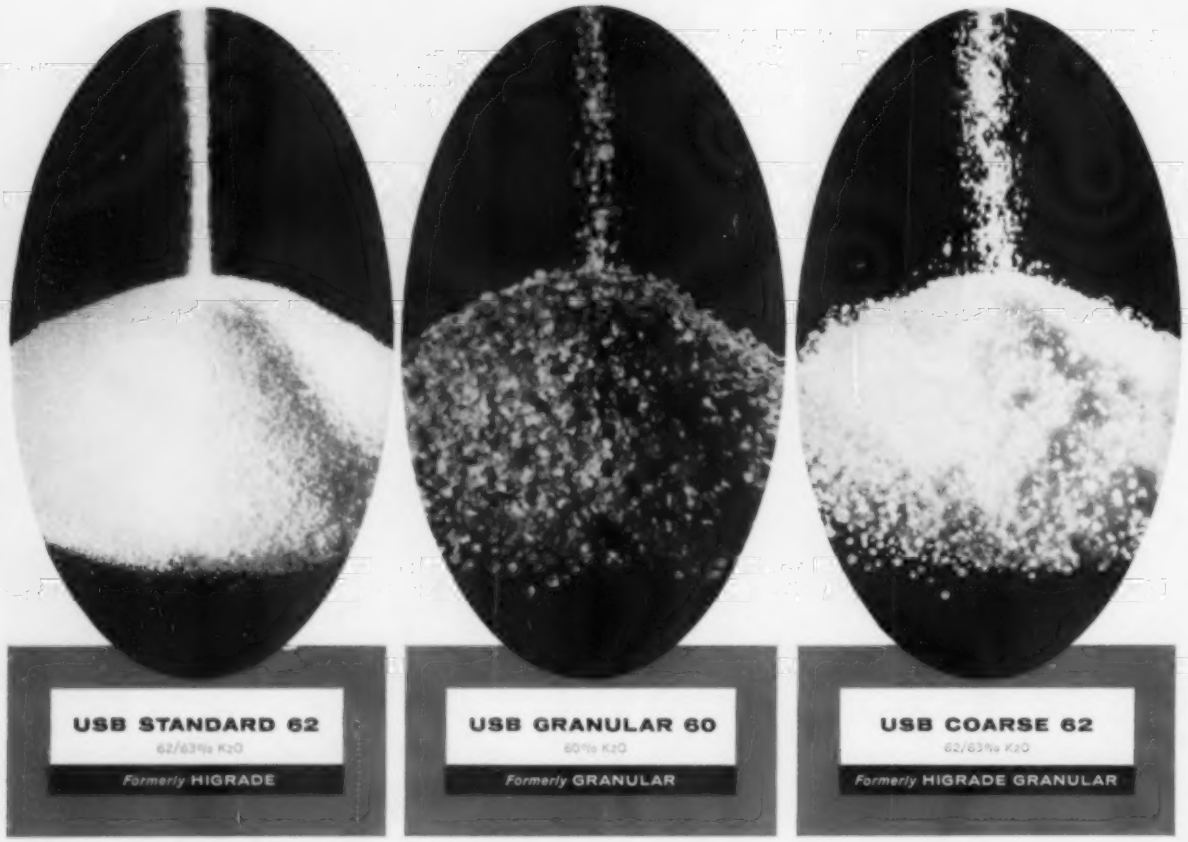

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Wanted: General Analytical Procedure for Detecting Traces of Several Pesticides

With the widespread use of synthetic, organic pesticides on food crops, there is an imperative need for procedures which will allow an analyst to detect in one operation trace quantities of a number of different pesticides in plant material and animal tissue.

THE modern trend in agricultural chemistry is to have new laboratories, new instruments and new insecticides, observed M. S. Schechter, USDA, in discussions at the pesticide symposium at the American Chemical Society* meeting, held last month in Chicago. "This, however," he continued, "does not mean that the old insecticide stand-bys are no longer with us. In fact, they are as much with us as ever."

"U. S. production of DDT has actually been increasing during the last three years," reported the speaker. 1960 production was over 163 million pounds. Production of aldrin, dieldrin, endrin, chlordane, heptachlor and toxaphene amounted to over 90 million lbs. in 1960.

It is true that there is increasing competition from the organophosphorus insecticides, carbamates and others, but there are certain advantages that make the use of chlorinated organic insecticides rather appealing: (1) They are relatively inexpensive. Thus they can be used at considerably higher concentrations than required for marginal control; they are suitable for large-scale airplane applications to such crops as cotton and to such insects as grasshoppers, fire ants, mosquito larvae, etc. (2) They are long-lasting and do not have to be reapplied so often . . . a big advantage where a long residual effect is desired, such as for roach or termite control. (3) In spite of the resistance problem, the chlorinated insecticides are still extremely effective against many types of insects — Japanese beetles, corn insects, some cotton insects, grasshoppers, termites, fire ants, etc.

What about residue problems with this class of insecticides? "Actually," remarked Mr. Schechter, "if the directions on the labels and the recommendations of the USDA and State Experiment Stations are followed, there is no reason why the chlorinated organic insecticides cannot be used in a safe and effective manner." There are, of course, problems. Excessive residues will result if higher concentrations than necessary are used—if applications are repeated too often. Drift of dust or spray from one field to another can also cause difficulties. Long residual action and long persistence account for most of the residue problems.

W. P. McKinley and G. Savary, Tunney's Pasture, Ottawa, Canada, pointed out that with the widespread use of synthetic, organic pesticides on food crops, there is an imperative need for procedures which will allow the analyst to detect trace quantities of a number of different pesticides by one operation in plant material and animal tissue. The producer of a pesticide normally develops a satisfactory analytical method for this particular pesticide. Mr. McKinley pointed out, however, that in most control laboratories, the staff is not large enough to allow the analyst to use a different method for each and every pesticide on each different type of food. It is important to develop one general method which can be used quantitatively and qualitatively for several pesticides.

In any method of analysis the pesticide must be removed from the food by extraction with a suitable solvent such as chloroform. This step removes a large quantity of extraneous material such as fats, waxes and pigments as well as the trace quantities of pesticide residues. The next step in all procedures of analysis is the removal of these extraneous materials without loss of the pesticides. This is usually a difficult task when one is interested in only one pesticide, but it becomes a great deal more complex when one is interested in developing a procedure which will remove all the extraneous material without loss of some of the pesticides, since these compounds have very different physical properties. One may pass an extract of a fruit containing six pesticides through a cylindrical column containing a powder of chalk, charcoal or some other type of material. The extraneous material may be held on the powder as well as two of several pesticides. One must then try some modification in the procedure until a technique is found

* 140th National Meeting, American Chemical Society, Sept. 3-8, 1961, Chicago.

Because of the increased emphasis by the Food and Drug Administration on more efficient procedures for extraction and cleanup of pesticide residues, studies of many procedures on common pesticides and crops are continuously required.

which will allow all of the pesticides to be recovered free from the impurities or extraneous material. The third stage in these procedures is to identify the pesticides present and to determine their amounts. This latter stage can be handled quite readily by existing methods and equipment, if the removal of the extraneous material can be accomplished efficiently.

The authors described a cleanup procedure developed in the Ottawa laboratory for the isolation of several chlorinated insecticides: DDT, DDE, Rhothane, Dieldrin, Methoxychlor and Kelthane, from extracts of plant material.

The procedure consists of: removal of the extracting solvent, precipitation of the waxes in acetone at -70° C., and removal of the pigments and the remaining waxes on a Florisil column with benzene as the eluting solvent. This technique has been extended to the recovery of residues of DDT, DDE, and Rhothane from a number of animal fats.

A column consisting of a mixture of Darco G60 and Solka Floc (wood cellulose) has been employed in the recovery of dieldrin, methoxychlor, and Kelthane from plant material using acetone as the eluting solvent. This same type of column and the eluting solvent have been utilized at −70°C. for the isolation of dieldrin from butter fat after partitioning the fat between acetonitrile and *n*-hexane.

C^{14}-labelled DDT and dieldrin were employed in the quantitative recoveries and the applicability of paper chromatography served as an index of purity of the column eluates.

In another report on "A cleanup procedure for the chromatographic identification of some organophosphate insecticides," W. P. McKinley collaborated with H. F. MacRae also of Tunney's Pasture, to describe a method where an acetone solution of plant extracts is passed through a column which retains pigments, waxes, and other interfering substances, allowing the organophosphates to pass through and subsequently be identified by paper chromatography. They indicated that this procedure has been applied only to the identification of the parent compounds in the presence of apple, lettuce, cabbage and orange extracts obtained by two extraction procedures.

Parathion Extraction and Cleanup

In another discussion on extraction and cleanup studies for parathion residues on leafy vegetables, C. H. VanMiddelem and R. E. Waites, University of Florida, reported that significantly higher residues were recovered when treated celery was blended for 5 minutes in benzene *vs.* end-over-end tumbling in the same solvent. An extraction and cleanup efficiency study on mustard greens resulted in no significant differences in parathion recoveries when maceration in a dual solvent 2-propanol + benzene) was compared with the one solvent maceration plus tumbling technique. Regarding cleanup efficiency in this study significantly higher recoveries resulted when a 5:7 florisil to hyflosupercel chromatographic column was compared with shaking the plant extract in a conventional decolorizing mixture and filtering. The results of four extraction studies on spinach involving parathion recoveries as well as several cleanup techniques were reported. The four extractions involved are maceration for 5 minutes in benzene only, tumbling end-over-end in benzene only, maceration for 2 minutes in IPA + 2 minutes in benzene, with and without 30 minutes of end-over-end tumbling. Because of the increased emphasis by the Food & Drug Administration on more efficient extraction and cleanup procedures, studies of this type on common pesticides and crops are continuously required.

Determining Organically Bound Cl

Herman Beckman, University of California, described a technique for the analysis of halogenated hydrocarbon pesticides, using a combination of gas chromatography and sodium-liquid anhydrous ammonia reduction. The process includes a gas chromatographic isolation of the pesticide followed by a reduction to liberate the halogen; both steps give a measure of the pesticide present. A third and final step for further identification and quantitative measurement of the pesticide involves a final gas chromatographic analysis of the organic residue left after the reduction in liquid anhydrous ammonia and removal of the halogen.

The organic phase left after sodium reduction is taken up in a solvent and condensed in a Kuderna-Danish evaporative concentrator. This residue is then reintroduced into the gas chromatograph. The peak or peaks obtained would be characteristic of the parent compound.

The system would give three measures of a residue. The halogen analysis would be more than the classical total halide since the determination would show only the halogen obtained from the fraction taken from the gas chromatograph. It would thus be semispecific and should couple with the gas chromatographic chart data. The final gas

(*Continued on Page* 87)

Metal Ammonium Phosphates As Non-Burning Fertilizers

Metal ammonium phosphates —a new fertilizer that will not cause salt injury to seeds and plants, and offers a long-lasting nitrogen source.

(Summary of a report presented by G. L. Bridger, W. R. Grace & Co., at the annual meeting of the ACS, September 3-8, Chicago.)

A NUMBER of divalent materials including magnesium, iron, zinc, copper, and maganese form ammonium phosphates having the general formula $MeNH_4PO_4 \cdot H_2O$. These compounds are only slightly soluble in water and soil solutions.

The slight solubility of these compounds suggested that they might be useful as non-burning and long lasting sources of nitrogen, phosphorus and the various metals. Magnesium ammonium phosphate, for example, has been mentioned occasionally as a possible fertilizer material — but has never been commercially available or used widely for fertilizer purposes. On the other hand, it is present in certain natural fertilizers such as guano. The other metal ammonium phosphates have not been used as fertilizers.

Studies at the W. R. Grace & Co., Research Division, have shown that metal ammonium phosphates have remarkable properties as fertilizers—that they can be used effectively either for soil or foliar application.

In November 1960, W. R. Grace announced the new fertilizer 8-40-0, a magnesium ammonium phosphate compound, composed of 8% nitrogen, 40% available phosphate and 24% magnesium oxide. It was suggested especially for the forestry industry. A second metal compound, 7-35-0, ferrous ammonium phosphate, was announced to be equally effective in some forestry applications, but primarily recommended for use in nursery beds.

Magnesium ammonium phosphate and ferrous ammonium phosphate have been tested as ingredients of mixed fertilizers. Laboratory tests of the mixtures indicated that nitrification rates were decreased with increased particle size. Agronomic tests with turf, vegetables and ornamentals indicated the mixtures were more slowly available and efficient than conventional mixtures. Residue analysis of large granules present in soil for nine months indicated that the water-soluble components of the mixture had been occluded somewhat by the metal ammonium phosphates. Thus, rate of availability of the soluble portion was also reduced.

Zinc ammonium phosphate was used in caking tests of mixed fertilizer by Caro *et al* [*Agricultural Chemicals* 15, No. 1, 34 (1960)]. They concluded that addition of this compound did not induce caking of their test mixtures. Several other conventional sources of zinc on the other hand increased caking considerably.

Agronomic Applications

The metal ammonium phosphates, due to their low solubility, will not cause salt injury to seeds and plants. Thus they can be used in many applications where conventional soluble fertilizers are not suitable. These applications include seed coating, placement near the seed, placement in the planting hole with the seedling, and foliar spraying.

Rate of availability can be controlled by granulation. Due to the

(*Continued on Page* 80)

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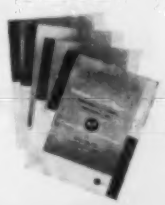


Fertilizer Solutions Association Meeting Dec. 30 in Chicago

THE annual convention of the National Fertilizer Solutions Association will be held in Chicago October 30-31 and November 1 at the Edgewater Beach Hotel. The program will feature speakers from all parts of the country. Archie V. Slack, head of fertilizer research for TVA, will discuss suspension fertilizers, and will have an extensive exhibit set up during the 3-day affair.

Also on the program is J. D. Sykes, vice president in charge of Public Relations for the Ralston-Purina Co., whose topic will be "Serving the Modern Farm Market." Mr. Sykes, a former chairman of the board of directors of the American Feed Mfgrs. Assn., has also served on the council of the world's Poultry Science Assn. Another speaker is Dr. G. Herbert True, vice president of the True-Klemp Organization, South Bend, Indiana. His topic is "The Care and Feeding of Ideas."

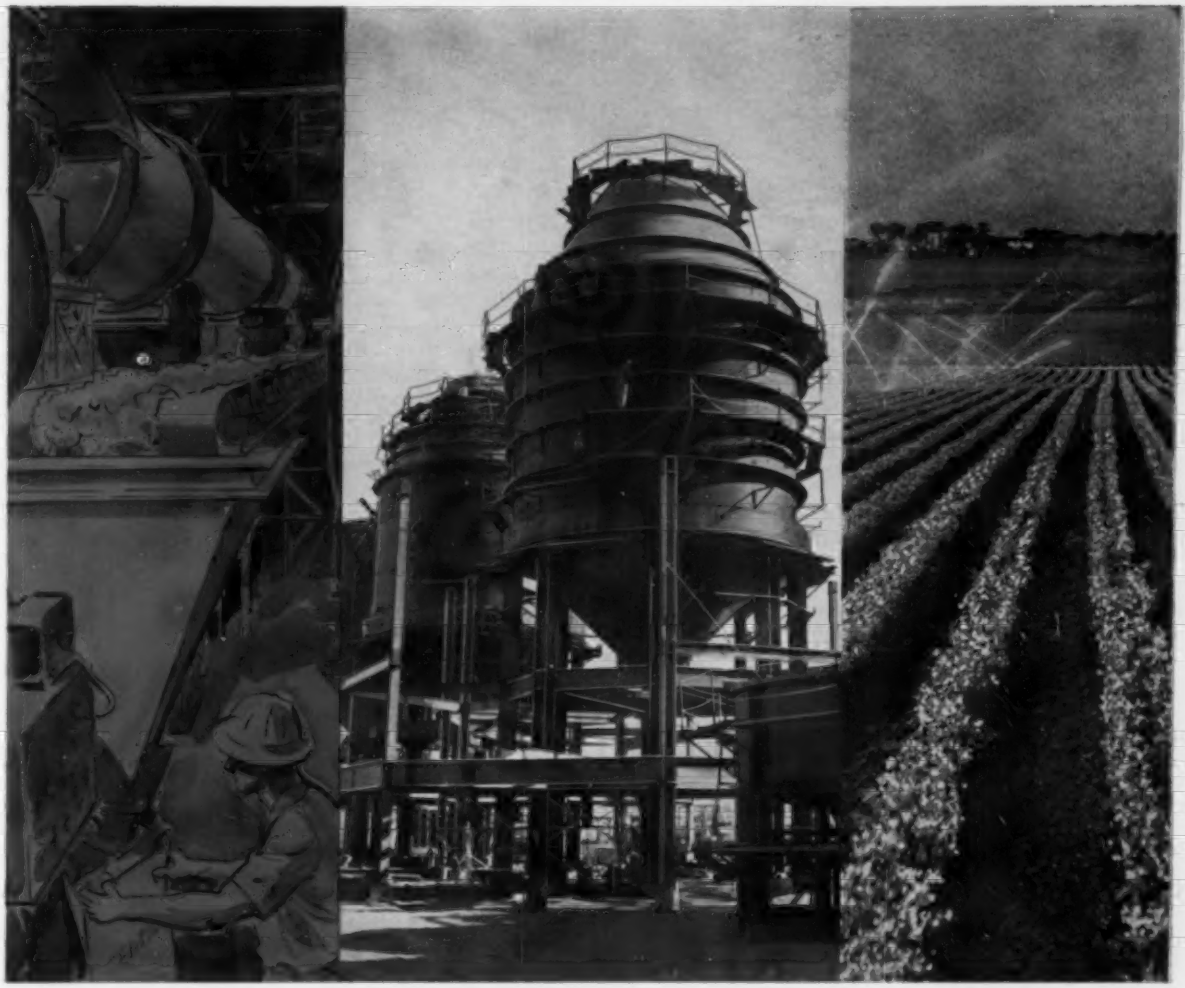
Joe Bohlen George Beal

A. V. Slack J. D. Sykes

"The Role of the Dealer in Fertilizer Sales" is the topic of a discussion to be presented by Dr. Joseph Bohlen and Dr. George Beal of Iowa State University. These men are considered authorities in the dissemination of ideas, particularly as they apply to farm practices. This is their second appearance before the National Fertilizer Solutions Association.

Two panel discussions, moderated by Dr. J. L. Strauss of Ris-Van, Inc., Belmond, Iowa, will cover "Aids to Future Sales" and "Side-Dressing." Subjects such as trace elements, insecticides, pesticides, herbicides and various methods of side-dressing will be discussed.

Forty-one suppliers of raw materials and equipment for this industry will exhibit the latest developments in fertilizer solutions manufacture, transport, storage and application.★



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This 1953 photo shows weed-choked Burtis Bay is Chautauqua Lake, New York, before chemical spraying began.

August, 1960 — It took seven years, but clear waters of Burtis Bay are self-evident in this "after" photo.

Community Project

Aquatic Weed Control

Credited With Save Of "Major Industry"

In a pilot weed-control program conducted by the State of New York, 136 acres of Chautauqua Lake were sprayed with aquatic herbicides from 1956 to '58. A local group is continuing the program and sprayed 1,500 acres in the next 2 years. The lake is the area's major industry.

by Robert Dyment

Dunkirk, N. Y.

THE control of aquatic weeds soon will have to be regarded as something more than a side-line by herbicide manufacturers and applicators if the use of lakes for recreational purposes in the United States continues to increase as it has during the past decade. Just as the automobile and shorter work week have expanded home gardening and lawn care, so have they increased the popularity of boating, swimming, and fishing, as well as other recreational pursuits.

In one area of western New York, for instance, a lake is referred to as the "area's major industry." Famous for muskie and bass fishing, and as a resort area, Chatauqua Lake, is responsible for attracting tourist dollars upwards of six million each year to the area.

By 1955, however, water weeds threatened to turn the huge lake into a "frog pond." Paradoxically, the amount of objectionable weeds in a lake seems to increase in direct proportion to the increase in the lake's popularity. The lake-front property owners, themselves, probably are most responsible for this since they tend to apply large amounts of chemical fertilizers to their lawns and provide sprinklers to leach the fertilizers into the lake to provide nutrients for the weeds.

The State of New York operated a pilot weed-control project on the lake in 1956, '57, and '58, during which 136 acres were sprayed. The Chatauqua Lake Association a federation of organizations, business firms, and indivi-

Drums of chemicals arrive by boat for Chautauqua Lake spraying operations.

duals, continued the program and sprayed approximately 1,500 acres of weed growth in 1959 and 1960. The program is being conducted on a yearly basis and this year a total of better than 800 acres were scheduled to be covered by the spraying operations.

Crewman in a specially equipped barge spray weeds close to shore. These are the weeds that are described by Philip B. Wagner, executive secretary of the Chautauqua Lake Association, as "nuisance" weeds—so thick that prior to spraying it was impossible to boat, swim, or fish in them.

State permits are required for the spraying operation, of course, and the association is allowed to spray only 200 feet out from shore, although they can go further if the water is less than six feet deep. The spraying program is financed by public subscriptions, but, in 1959 and 1960, realizing the importance of the program, the Chautauqua County Board of Supervisors gave $1 for each $4 raised in subscription for weed control.

Mr. Wagner says that their is no permanent solution to the weed problem, but that the job will become easier with each passing year. Some areas sprayed will again have to be treated every other year. During 1960, he said, more than 7,500 gallons of chemical was placed on the weed-congested sections of the lake.

The 30-foot aluminum barge owned by the group to hold weed spraying equipment is a former Army pontoon and was assembled at a cost of $2,500. It is capable of delivering 60 gallons per minute of sodium arsenite solution. The barge carries 13 drums at a time, resulting in a total load of about 5½ tons.

Although sodium arsenite has been the major herbicide used, the association treats parts of the lake with granular 2,4-D in test applications requested by the state.

In 1959, the association greatly expanded the state's trial program and successfully treated 780 acres, using the 2,4-D granules for the 160-acre Mayville area at the northern tip of the lake, and sodium arsenite for the remaining areas. The total cost was $18,000. In 1960, the program was continued to cover most of the areas treated the previous year. The Chautauqua Lake Association now budgets $20,000 per year for weed control.

The sodium arsenite is sprayed on the lake's surface at a rate of 7½ parts per million. All areas sprayed or to be sprayed are posted by the association with warnings that chemical weed control is in progress. Persons in the area are advised to stay away from the equipment and keep their animals away, and not to use the water for any purpose until it has been cleared by the State Health Department. This clearance usually comes in about ten days, following systematic tests of the water.

That the association has never had any difficulty in obtaining clearances can be credited to its efforts to determine the exact water volume of areas to be sprayed. In order to do this, the association members, aided by lake-minded volunteers, bore holes through the ice during March to plumb water depths. Ferdinand Wiener, State Distirct Health Engineer, explains that it is necessary to make soundings through the ice because an application for a permit to spray must be sent to the State Water Pollution Control Board well in advance of planned operations.

"The control board insists that a maximum concentration of arsenic trioxide, the effective weed-killing agent, must not exceed ten parts per million, which is one-thousandths of one per cent," Mr. Wiener points out.

The first locally-financed weed control project on Chautauqua Lake was begun in June of 1959.

(*Continued on Page* 88)

Members of the Chautauqua Lake Association are spraying Chautauqua Lake waters with chemicals from a 30-foot aluminum barge. The craft is capable of delivering 60 gallons solution per minute and carries a load of about 5½ tons.

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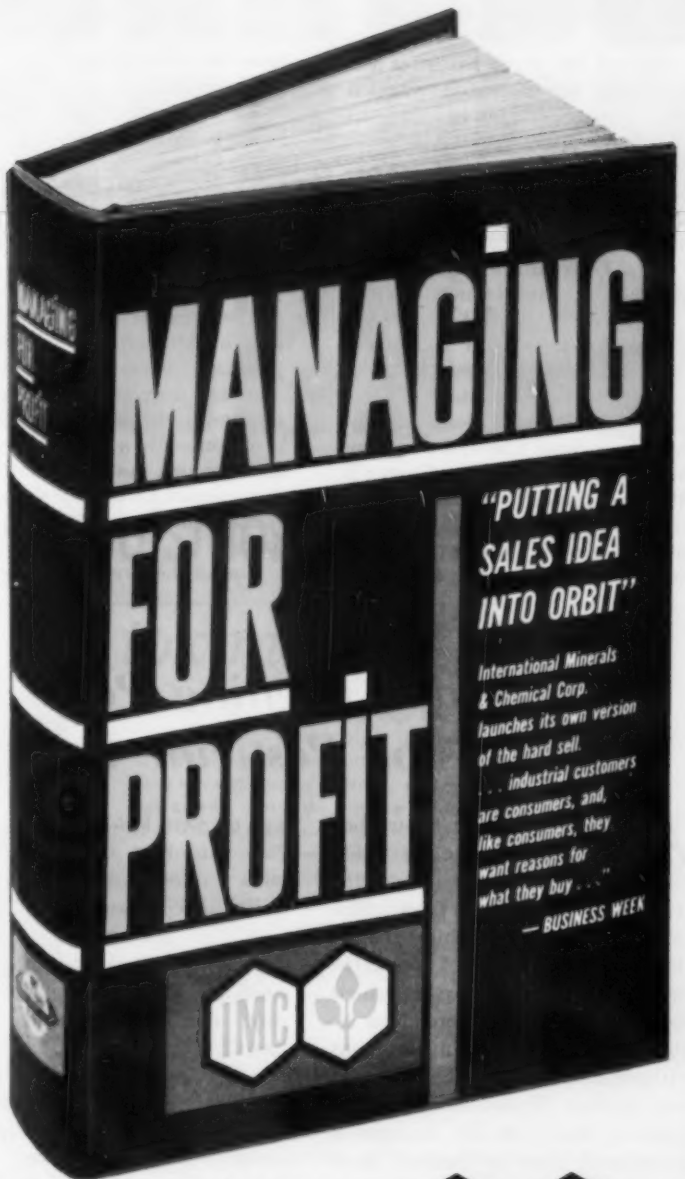

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Pesticides Are Good Friends, But Can Be Dangerous Enemies if Used by Zealots

Although chemical sprays for trees and crops have been essential to agriculture for more than two generations, the indiscriminate use of certain insecticides in recent years is disturbing. Today there are hundreds of powerful preparations on the market which too often are scattered broadcast by airplane in vast quantities and without due care.

One of the work horses of the insecticide group is DDT, which does a remarkable job in killing off bugs and worms. It also kills birds, fish and small game. Some chemists are wondering out loud whether the stuff really is as harmless to the human system as claimed, and the Federal Government will not allow milk to be shipped interstate if it shows any trace of DDT. Tests have shown that once DDT is ingested into the human body, it never leaves. It is indestructible.

A special study done on the Michigan State University campus at East Lansing, by Dr. George J. Wallace, professor of zoology, was revealing. In an area that had about 370 robins in 1954, only fifteen could be found in 1957, after three years of intensive spraying for elm-bark beetles and mosquitoes. Hundreds of dying robins, jerking and trembling, were brought to Dr. Walter Nickell, at the Cranbrook Institute of Science, Bloomfield Hills, Michigan, but he was unable to save a single bird. The robins had ingested the poison when they ate earthworms, which had picked it up from decayed leaves that had fallen from the sprayed trees.

Robins are not the only birds to suffer from the sprays. Bluebirds have been decimated in many places. Chickadees, warblers, nuthatches, woodpeckers, titmice, blue jays, thrashers, grackles, flickers and other varieties have suffered alarming declines in numbers.

Perhaps one of the worst examples of misused insecticides can be seen in Mississippi, Alabama and Louisiana, where a massive extermination program is being carried out against the fire ant. The fire ant is undoubtedly a miserable pest to have around, but it is doubtful that the program justifies the slaughter of millions of birds, fish and small game.

For all these reasons it is encouraging that the Federal Government is setting up a special pesticides coordinating committee to look into the whole matter. One of the group's first tasks will be a close look at the operation of the fire-ant program.

The sad thing about all this is that the new chemicals, properly used, are a tremendous boon to the farmer. Without them our bountiful agricultural plant would be twenty-five years behind the times. But there is no doubt that these new pesticides are not meant to be broadcast from the air willy-nilly on every hamlet that is bothered with mosquitoes.

According to the not exactly complacent Doctor Wallace, "The current widespread and ever-expanding pesticide program poses the greatest threat that animal life in North America has ever faced—worse than deforestation, worse than market hunting and illegal shooting, worse than drainage, drought or oil pollution, and possibly worse than all of these decimating factors combined." If the programs are not curbed, he adds, "we shall have been witnesses, within a single decade, to a greater extermination of animal life than has occurred in all the previous years of man's history on earth."

'Saturday Evening Post' Warns on Pesticide Use

AN editorial in the September 2 edition of the *Saturday Evening Post* said that the "indiscriminate use of certain insecticides in recent years is disturbing. Today there are hundreds of powerful preparations on the market which too often are scattered broadcast by airplane in vast quantities and without due care." The editorial was entitled "Pesticides Are Good Friends, But Can Be Dangerous Enemies if Used by Zealots." It is reproduced in its entirety above.

Denis Hayley, director of information for the National Agricultural Chemicals Association, Washington, D. C., in a strong protest to Ben Hibbs, editor of the Post, said that the editorial contains a number of misleading and quite biased statements. "We are sure," Mr. Hayley said, "(that the statements) would not have been cited had the facts been known to your editorial research department."

NAC takes exception to the Post's reference to a study done on the Michigan State University campus by one observer. "Individual observations such as this one," NAC points out, "must be evaluated in relation to the overall use of pesticides in the U. S. before a sensible – not a sensational – report of effects on wildlife can be given." NAC disclosed to Mr. Hibbs that the National Academy of Sciences - National Research Council formed a Committee on Pest Control and Wildlife Relationships in June, 1960, to evaluate such reports.

In connection with the editorial's reference to the fire ant control program in the Southern states, NAC points out that this program has met with unqualified support of several of the states where the fire ant menace has been greatest. "Despite the hysteria created by a few wildlife enthusiasts," NAC states, "practical, level-headed scientists and administrators have resolved the matter of controlling fire ants with a very minimum of hazard to wildlife populations. A memorandum on this subject was written in June, 1958, by Herbert

(*Continued on Page* 80)

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To Maximize Profits

WHY Should A Farmer Buy Fertilizer?

Changes in agriculture are influencing farmers in their decisions about fertilizer use. Many alternative uses of limited capital funds are available to farmers today that were not available a few years ago. It is a challenge to the fertilizer industry, to dealers, to researchers, and to educational workers to keep up to date, to supply the facts and, to work more closely with users of fertilizer and lime in order to increase their profits.

by J. H. Yeager

Department of Agricultural Economics
Auburn University

THERE are many things that affect profits from farming and the use of fertilizers. Some of these factors are government policies and programs, the cost of fertilizer relative to the cost of other resources used, and the returns or prices received for the products produced. The farmer's state of knowledge and his understanding of fertilizers and their use are also factors. In turn, the fertilizer dealer and his representatives play a key role in supplying farmers with facts and in influencing the farmer relative to fertilizer use.[1]

Times are changing rapidly. The advances in technology have, in many cases, made the use of fertilizers more profitable. For example, with complete mechanization of production operations one can achieve better weed, insect, and disease control. Improved varieties and cultural practices also help to increase yields. With increased yields, unit costs are normally reduced. This affords higher returns to the resources such as fertilizer used in the production process.

Alabama farmers spend about $50 million each year for fertilizer and lime. In 1958, farmers in Alabama spent $44.8 million for fertilizer and lime which was 12.5 per cent of the total production expenses. In 1950, fertilizer and lime expenditures were 21.3 per cent of total production expenditures. Farmers in the United States, as an average, spend about 5 per cent of total production expenditures on fertilizer.

In Alabama, the proportion of total expenses going for fertilizer and lime has decreased while expenditures for feed and livestock have increased since 1950. Apparently, many Alabama farmers are getting returns from investments in feed and livestock that compete quite favorably with those from the use of fertilizers. Competition for the farmer's expenditure dollar means that the facts on returns for the use of fertilizer and lime must be made available and understood. The fertilizer dealer must also understand and recognize the alternatives that farmers have for use of limited capital funds.

Changes in Costs

Relative changes in costs of items that farmers buy affect the

From a paper presented at the 1961 Fertilizer Conference, July 18-19, Auburn University, Auburn, Alabama.

[1]Research work reported in Alabama Agricultural Experiment Station Bulletin 320, "Fertilizer Use and Practices by Alabama Farmers" indicated that the fertilizer dealer was the most frequently reported source of information to farmers about new fertilizers.

quantity of production items used. If the cost of a production item increases, producers generally tend to use less of the item. However, the changes in quantity used as a result of a price change must be considered together with the changing cost of substitute items. Farm labor and machinery afford an example.

Since 1950, farm wage rates have increased 51 per cent, while farm machinery costs have increased 41 per cent. As a result, more and more farmers have turned to substituting farm machinery for labor.

Fertilizer prices have increased only 6 per cent since 1950. Prices paid for feed, livestock, and seed have declined since 1950. Items of farm origin generally have declined, while those items used in production that are of non-farm origin have increased. USDA economists predict about the same pattern in increased costs of non-farm items between 1960 and 1965.

Changes in Prices Received

Changes in prices received by farmers probably influence fertilizer use. If prices received increase, while costs remain about the same, farmers generally find it profitable to apply additional amounts of fertilizer. They can afford to go further out on the fertilizer response curve.

Since 1950, the index of prices received for all commodities has declined. The decrease in prices received by Alabama farmers for all commodities and all crops was about 10 per cent from 1950 to 1960. The decline in prices received together with a 5 per cent increase in fertilizer prices and government policies and programs are important factors in the decrease in amount spent for fertilizer from 1950 to 1958.

How much fertilizer to use is an important decision to farmers. What kind of fertilizer, how to apply it, and when to apply it are equally important decisions. However, to simplify the economics involved, consideration will be given only to the question of how much fertilizer.

Dr. J. T. Cope Jr. of the Auburn Agronomy Department summarized data from 309 experiments carried out at various locations in Alabama from 1925 to 1952 on the response of corn to nitrogen. It is assumed that plant nutrients other than nitrogen were not limiting factors.

His figures show that as more nitrogen was applied there was less response to nitrogen. This is a characteristic of almost all response curves. The cost of nitrogen was charged at 12¢ per pound and the price or value of corn was assumed to be $1.20 per bushel. Value of the first 30 pounds of nitrogen applied in terms of the additional corn produced by this nitrogen was $21.60. In other words, $3.60 spent for nitrogen returned $21.60. This is $6.00 return for each dollar spent for the first 30 pounds of nitrogen applied. The second 30 pounds of nitrogen returned $19.20, the third $13.20, and the fourth $6.00. Based on an estimated increase in yield for the fifth 30-pound unit of nitrogen, there was a return of only $1.20.

Therefore the return was less than the cost of nitrogen at this level of appplication. It is obvious from these data that the greatest profit existed when between 120 and 150 pounds of nitrogen were applied. This does not consider the small additional cost of harvesting the greater yield nor of applying the additional nitrogen. If total costs of producing corn were calculated for the various levels of nitrogen use, one would find that the cost per bushel decreased rapidly up to the level of 90 pounds of nitrogen per acre.

Although the most profitable level of nitrogen use on corn appeared to be between 120 and 150 pounds per acre, many farmers do not apply this quantity. The major reasons appear to center in limited capital available for fertilizer use, the uncertainty or risks involved (droughts, excessive rainfall, price risks, and others), and the existence of alternative uses for capital funds that may pay equally as well or better than funds spent for fertilizer. Also, alternative uses of funds may not involve the risk and uncertainty associated with crops and pastures. Moreover, not only do various farm or production possibilities compete for limited funds, but also the home and family needs call for expenditures. In a recent housing survey of 665 rural residents in Alabama, Mississippi, Georgia, and South Carolina, housing and business needs including farm needs, were not reported as requiring most urgently an expenditure of funds. Greatest needs, as reported, were for expenditures on items such as automobiles, television sets, and boats.

With limited capital available, farmers spread the use of their funds in order to get the maximum dollar return or the maximum satisfaction based on their value judgments. Theoretically, farmers distribute their limited capital so that any change in use of capital will not bring in any more income.

(*Continued on Page* 88)

Many farmers do not use optimum amounts of fertilizer because of the limited capital available to them, the risks involved in crop production, and the existence of alternative uses for capital funds that may pay equally as well as funds spent for fertilizers. In addition, farmers of today tend to spend more on home and family needs.

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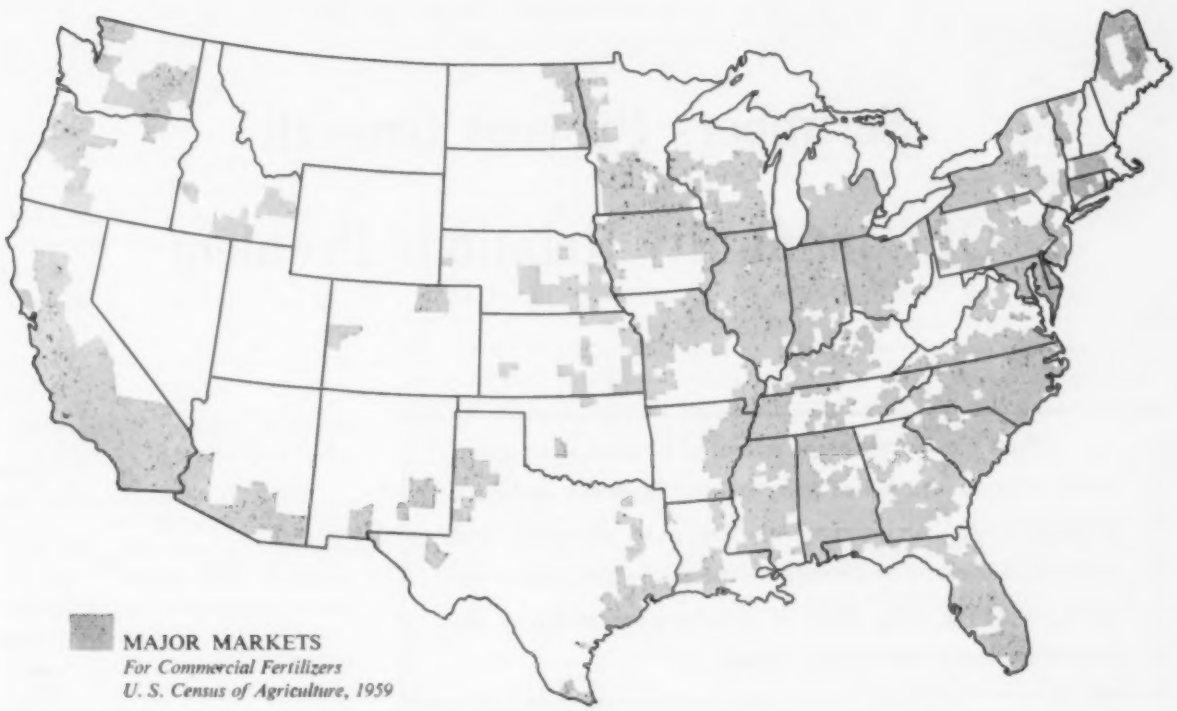

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AG CHEM

PRODUCTION ROUND TABLE

Scrubbers Prevent Growth Of Community Relations Problem

When the Martin plant operated at peak production rates, a dense column of fines emitted from the cyclone's exhaust stack. Depending on the wind direction and velocity, this cloud of limestone dust would either coat the trees until they were white or envelope the whole crushing operation in an opaque cloud.

IN an effort to expand its market for direct field application of agricultural limestone, Ivan M. Martin, Inc., Lancaster County, Pa., opened a new plant in the fall of 1959 to crush purchased limestone. A demand had developed in the three-state area served by Martin for a limestone with a higher magnesium content than was available from Martin's quarrying and crushing operations. To satisfy this demand, Martin established a pulverizing operation near a source of limestone of this character.

Crushed stone, between 1-½ inches and ½ inch, and ready for the pulverizer, is purchased from a nearby quarry. To get better pulverizing action Martin pre-dries the limestone. Stone is taken from the reclaim pile by conveyor into a surge hopper and passed through a rotary dryer before pulverizing (figure 1). It was this drying operation that presented Martin with a community relations problem.

Martin was well aware that the rotary dryer would be a source of dust. To eliminate this dust problem, they included two cyclones to separate the limestone from the dryer exhaust. What they did not anticipate was the large amount of ultra-fine dust particles that would be contained in the dryer discharge. In the busy season, the operation is run at as much as 20 hours a day, drying

Figure 1. Crushed rock at Martin's agricultural limestone pulverizing plant is taken from a reclaim pile and deposited in the funnel-shaped surge hopper (left). After passing through the rotary dryer, limestone is conveyed to the top of the pulverizer house. Multiple cyclones and the scrubber clean 16,000 cubic feet of rotary dryer exhaust air per minute.

and crushing 30 to 35 tons of limestone per hour.

When the plant was operated at these production rates, a dense column of fines emitted from the cyclone's exhaust stack. Depending on the wind direction and velocity, this cloud of limestone dust would hang in the valley and coat the trees until they were white; or if there were no wind, the entire crushing operation would be enveloped by a cloud of limestone dust that could not be seen through.

Martin ordered the crushing operation to be shut down whenever dusting conditions became bad, and steps were taken to determine the cause of all the dust, and to see what could be done to correct it.

Three standard ASME tests were run to determine the solids content of the gas emitting from the cyclones. The solid material was collected in paper thimbles, and the weight of the solids captured in this manner was determined. The stream of gas contained 3.54 grains of limestone per cubic foot, almost nine times the content allowable by the most stringent air pollution control laws.

On the surface, this might indicate that the two cyclones were not operating properly. However, further analysis of the collected dust indicated that the two cyclones were doing essentially what they are designed to do. Multiple cyclones will collect particles down to five microns in diameter with an efficiency of between 90 and 95 percent by weight. Particle size analysis showed that 86 percent of the cyclone exhaust dust was five microns and smaller. To make matters worse, 51 percent of the exhaust gas was one micron or less in size.

Martin installed a Hydro-Volute* wet scrubber to obtain scrubbing action on very fine particles by the cyclonic action of the gas flow in a series of chambers, see figure 2. Each chamber is shaped to produce a vortex within the chamber so that the dust particles are trapped, wetted, and removed from the gas stream.

There are no moving parts in the Hydro-Volute. Gas flows through venturi-shaped throats between chambers. The venturies increase the gas velocity to: (1) impinge wetted gas particles against the wall and (2) obtain more violent vortexing and, thereby, more positive scrubbing.

*Developed by Johnson-March Corp., Philadelphia.

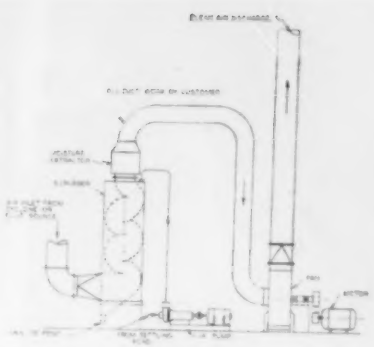


Figure 2. The Johnson-March Hydro-Volute scrubber has no moving parts. Scrubbing action is obtained by the cyclonic gas flow in each of the chambers. Each chamber is shaped to produce a vortex, or swirling, action. The gas is scrubbed with water so that dust particles are trapped, wetted, and removed from the gas stream.

The scrubber was installed and an analysis was again made of the exhaust. Dust loading at the outlet of the scrubber was only 0.204 grains per cubic foot. This is almost twice as good as the most rigid air pollution code for any area in the United States. Even the most rigid codes allow at least 0.4 grains per cubic foot to be discharged at standard conditions.

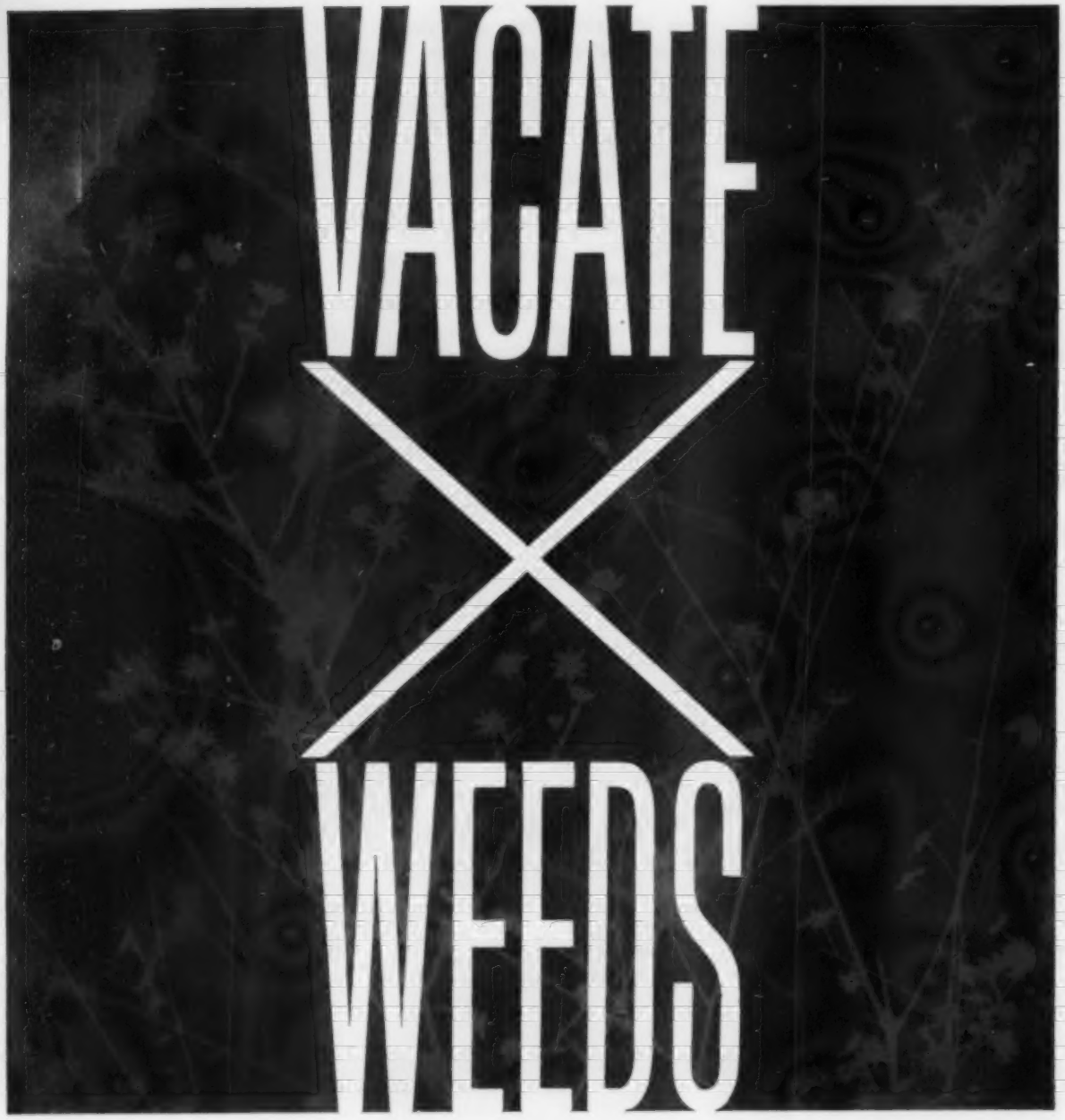
At the Ivan M. Martin plant stone is pulverized to the following specifications: 98 percent will pass through a 20-mesh screen; 80 percent through 60-mesh; and 75 percent through 100-mesh. Trucks are loaded by gravity from the two storage silos for direct field application throughout the tri-state area of Eastern Pennsylvania, Delaware and New Jersey.★★

Figure 3. With the scrubber turned off, a heavy cloud of fine, white limestone emits from the stack and settles in the surrounding areas. More than 3.5 grains are contained in each cubic foot of exhaust gas.

Figure 4. With the scrubber operating, exhaust gases consist primarily of steam and contain only 0.20 grains per cubic foot. Even the most rigid air pollution control laws permit almost double this amount.

Equipment Reference

Pulverizer . . . Bradley Pulverizer Co., Allentown, Pa.
Rotary Dryer . . . McDermott Bros. Co., Allentown, Pa.
Multiple Cyclones . . . McDermott Bros. Co., Allentown, Pa.
Hydro-Volute Scrubber . . . The Johnson-March Corp., Philadelphia, Pa.
Truck Weighing Scale . . . Pennsylvania Scale Co., Bareville, Pa.



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This is it. The herbicide you hoped would come. The weed and grass killer that lasts more than one year. A patented feature of this killer is the chemically combined water which makes it dust free. It can be applied *any time* (most economical results are from spring or late fall spreading). It is easy to handle—requires no mixing, hauling water, or using expensive equipment.

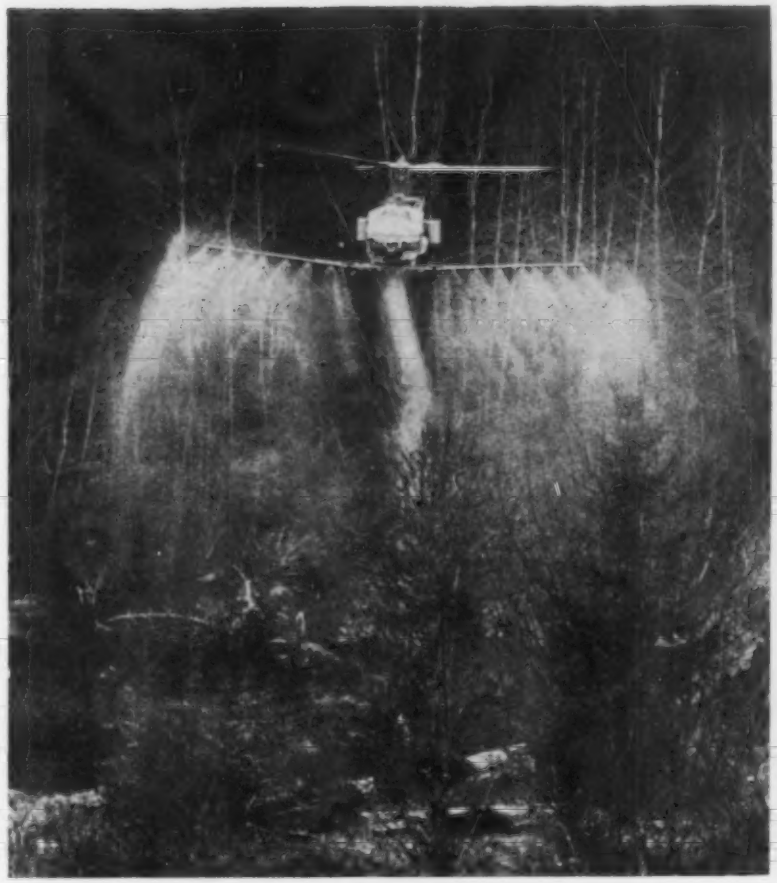
This is Diamond's new VACATE, and it has many physical advantages over previous formulations for battling weeds and grass. VACATE offers economy of application and efficiency in performance.

VACATE can be used anywhere a weed- and grass-free area is desirable. It controls all vegetation. Normal rainfall starts action—a total accumulated rainfall of an inch is ample. And it is safe . . . noncorrosive, nonflammable, and nontoxic. You ought to know the whole story. Write Diamond Alkali Company, 300 Union Commerce Building, Cleveland 14, Ohio.

VACATE is one of the

Diamond Chemicals

The Custom AG CHEM Applicator



Reforestation By Helicopter

Aerial spraying in western Washington and Oregon, to clear head-room for established conifers and to kill off scrub brush before planting, averages 9,500 acres annually, while distribution of Douglas Fir seed by helicopter covers 15,000 acres. Evergreen Helicopters has developed a seed broadcaster that gently, yet evenly, distributes seed over an 80-foot swath at 45 miles per hour.

EACH year almost 25,000 acres of forest lands in western Washington and Oregon are rehabilitated by helicopter spraying and seeding, according to a report recently released by Evergreen Helicopters, charter operator supplying year-long contract service for Weyerhaeuser Company's continuing forest rehabilitation program.

During peak periods, the operation keeps two 305-horsepower Hiller 12E's in the air up to six hours a day, seven days a week. Aerial spraying to clear head-room for established conifers and to kill off scrub brush before planting averages 9,500 acres annually, while distribution of Douglas Fir seed by helicopter covers 15,000 acres.

10 Gallons Per Acre

Under the direction of Weyerhaeuser's Longview Branch rehabilitation forester, Robert Johnson, the year's helicopter spraying begins on March 1. Flying from treetop level up to several hundred feet over the 3,500-foot elevation, Douglas Fir mountain terrain, Evergreen's spray gear-equipped Hiller sprays unwanted stands of still dormant deciduous trees and brush with a combination of 2,4,5-T and diesel fuel at a rate of ten gallons per acre.

About the first of July each year the helicopters, each loaded with 85 to 100 gallons of foliar spray on every run, treat other sites which are not receptive to dormant spray.

Actual seeding of the Douglas Fir crop to be harvested some 80 years later takes place in November, December, and January. During this final and most critical phase, Evergreen's owners, Delford Smith and Quay Jorgenson, work in close cooperation with Weyerhaeuser foresters to tailor seeding on an almost acre-by-acre basis.

One large contributing factor to the cost of reforestation by any

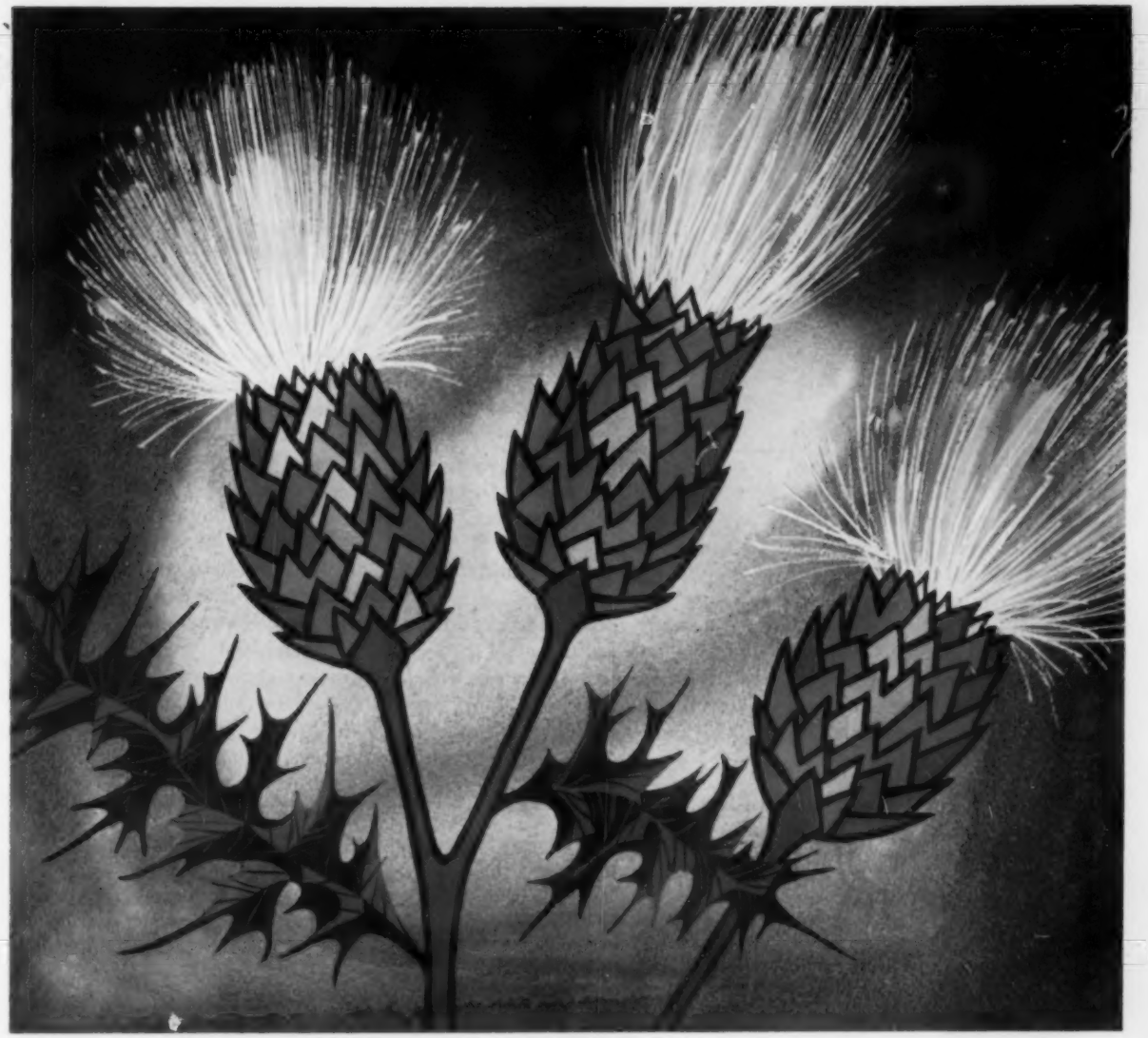
method is the $14 per pound price of good quality conifer seed. Besides their cost, the seeds are highly sensitive to contact. This posed a problem: how to propel them over a wide area without damaging them. Letting them fall from a hopper wouldn't take full advantage of the helicopter. Part of Evergreen's success in keeping seeding costs down is the development of its own seed broadcaster, which gently yet evenly distributes the seed over an 80-foot swath while maintaining a steady 45-mile per hour calibrated speed.

As a precaution against rats, mice, and ground squirrels, the Douglas Fir seed is coated with Endrin.

Immediate areas to be seeded are matched with the individual lots of seed on hand as to plot elevation, yearly rainfall averages, and general climatic conditions of the parent forest stands. After the final seed selection is made, the forester and pilot confer on flight plans.

One alternative is to fly at 45 miles per hour covering 7.5 acres per minute with the Hiller's 80-foot trail of seed distribution. More often, however, the decision is made to cross-fly to assure complete coverage in uneven terrain. On cross-flight application, the helicopters make a second pass at right angles to the first, to insure thorough distribution at three acres per minute. The rate of seed dissemination is adjustable to within a few ounces per acre.★★

Spray runs with this Hiller 12E helicopter were carried out with 85 to 100 gallons of 2,4,5-T and diesel fuel mixture at elevations up to 3,500 feet. Tank trucks and mixing units are at the scene to reduce loading time.



CONTROL CANADA THISTLE

WITH OLDBURY® SODIUM CHLORATE

Oldbury sodium chlorate was the most effective weed killer when it was first placed on the herbicide market thirty-five years ago . . . and it's still the most effective you can use today on such troublemakers as Canada thistle, Johnson grass, bindweed, and Russian knapweed.

Oldbury sodium chlorate sterilizes the soil . . . reaches right down to the roots of the weed . . . and keeps working for months.

Oldbury sodium chlorate is inexpensive. For a mere 25¢, you can sterilize 100 square feet of drainage ditch, fence line, or roadway for a year or longer.

Open-head drum empties easily. Oldbury sodium chlorate comes in a fast-opening drum. A single lever seals and reseals the drum with a metal band. Full-open head makes pouring, scooping, or shoveling easy.

Available in 50-, 100-, and 450-lb. sizes.

Technical aid. Full-time Hooker agronomists can help with weed control plans and advise on handling, storing, and using sodium chlorate. Write for descriptive folder.

HOOKER CHEMICAL CORPORATION

610 BUFFALO AVENUE, NIAGARA FALLS, NEW YORK

HOOKER CHEMICALS PLASTICS

Sales offices: Buffalo, Chicago, Detroit, Los Angeles, New York, Niagara Falls, Philadelphia, Tacoma, Worcester, Mass. *In Canada:* Hooker Chemicals Limited, North Vancouver, B.C.

Stull Invert Herbicide System Eliminates Drift

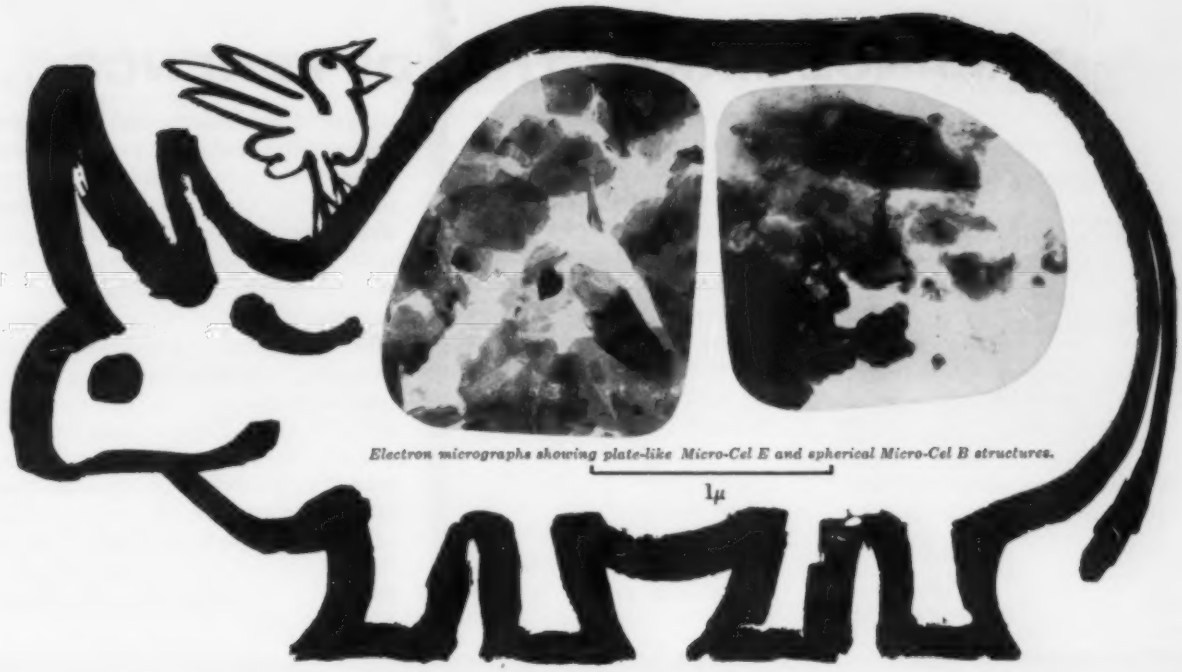
The Stull multi-purpose hand-gun sprayer is shown being demonstrated. It provides accurate spraying at distances up to 50 feet and reduces the possibility of drift damage. The unit can be operated from a pick-up truck, as shown, without anchoring.

The Stull Chemical Company, San Antonio, Texas, a firm specializing in research and development of brush and weed control and other agricultural chemicals and application equipment, has developed an invert herbicide system that eliminates drift.

The Stull process and system, consisting of (1) the non-drift herbicide, (2) a unique nozzle, and (3) a special herbicide spray mixture (Patents Pending), was developed jointly by Dr. Jud Morrow, director of Southwest Agricultural Institute and E. B. Stull, president of Stull Chemical Company.

Greatly expanded applications of weed and brush control through chemicals are expected to be possible since the system allows non-drift application by helicopters or fixed wing aircraft, ground mobile units, and newly-developed portable hand spray units.

The portable hand-gun spray unit offers a spray distance of fifty feet, combined with the non-drift characteristics of the mayonnaise-like spray, that provides accurate spraying and reduces the possibility of drift damage while spraying irrigation ditches, fence rows, rights-of-way, brush, and weed-ridden areas. The portable Stull unit weighs approximately one hundred pounds and may be transported and operated from a pick-up truck without anchoring. It is powered by a 7½ hp. air-cooled gasoline engine. The unit's bifluid process is accomplished with one feed-line to a drum of water and the other to the chemical. Both are connected to the nozzle where the water-in-oil emulsion is formed. This emulsion is a mixture of water, non-aromatic oil, and herbicide. Other additives include a surface active agent, an emulsifier, and a sticking agent.



Electron micrographs showing plate-like Micro-Cel E and spherical Micro-Cel B structures.

1μ

Micro-Cel is quite compatible!

Micro-Cel®, Johns-Manville's new synthetic calcium silicate, is chemically inert and is compatible with nearly all toxicants. Micro-Cel cuts shipping costs by permitting such high toxicant concentrations as 50% Heptachlor, 70% Toxaphene and 75% DDT. Micro-Cel's unique structural characteristics (surface areas up to 175 sq. m/gr) reduce caking, improve flowability, increase suspendability and extend shelf life. For further information, samples and technical assistance, mail in the coupon below!

JOHNS-MANVILLE
Celite Division

1961

JOHNS-MANVILLE, Box 325, New York 16, N.Y.
In Canada: Port Credit, Ontario.

☐ Please send further information.

I am interested in using Micro-Cel with the following toxicants: _____

☐ Please send free sample of Micro-Cel.

☐ Please have your local Sales Engineer contact me.

Name_____ Position_____

Company_____

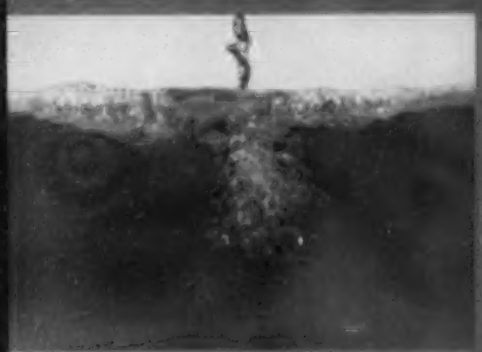
Address_____

City_____ Zone____ County_____ State____

BALANCE MAKES THE DIFFERENCE...

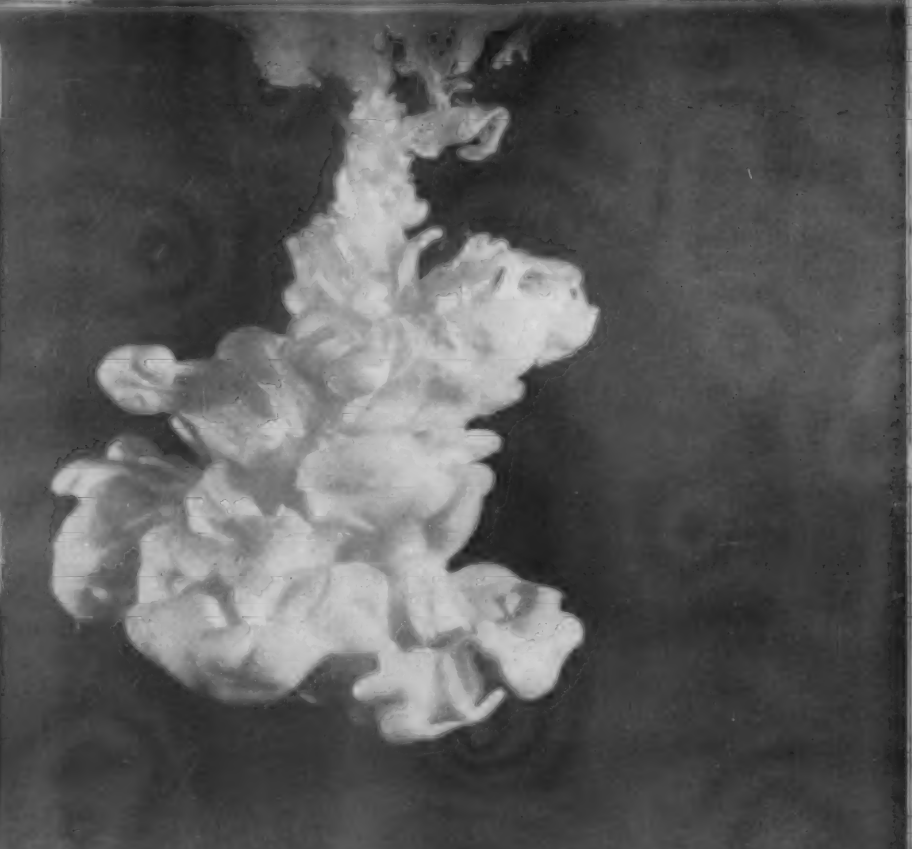
...in solving problems that involve surface active agents. The perfect balance of many components is often required to create an emulsifier to assure optimum performance. Proper balance also means savings through more economical emulsifier levels.

Witco's Emcol surface active agents offer the chemist the broadest latitude in solving problems involving emulsification, dispersion, and other colloidal effects. The Emcol line includes anionic, nonionic, and cationic products. For more information on these versatile materials, send for your copy of Witco's brochure describing the "Emcol Surface Active Agents". Write to Technical Service Department E-550.



1 Two immiscible phases separate immediately when a hydrocarbon solvent containing no emulsifier is poured into water.

2 The same solvent containing 3% of a poorly balanced blend of anionic-nonionic emulsifiers forms only a fair emulsion in water.



3 The spontaneous "bloom" of a good emulsion dispersing in water results from the perfect balance of an Emcol emulsifier at the same 3% concentration.

EMCOL DIVISION

WITCO CHEMICAL COMPANY, INC.

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Sales Offices in: Chicago • Boston • Akron • Atlanta • Houston • Los Angeles
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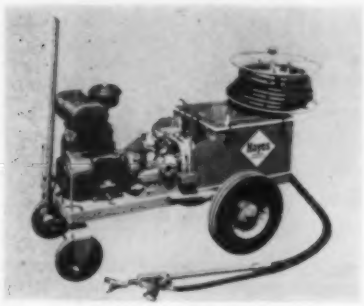
New Type Of Power Sprayer



Hayes Spray Gun Company, Pasadena, is offering a portable and compact, all-purpose heavy duty power sprayer—the Hayes Jet 500—based on a new principle in the power sprayer field. It serves many different kinds of purposes in farm and ranch operations.

Designed to provide high efficiency, reduce labor costs, and offer a wide range of chemical spray applications, this sprayer applies all types of insecticides, fungicides, weedkillers, herbicides, liquid and dry chemical fertilizers, bactericides, and germicides.

The Hayes Power Sprayer has no water tank and draws the water it needs from any faucet, irrigation ditch, stream, tank or pond. No chemical ever passes through the water pump. This protects pump parts against wear and any chemical contamination. As clear water is discharged from the pump, a vacuum is created in an external mixing chamber, which siphons chemical from the concentrate tank mounted on the chassis. Water and chemical are automatically mixed and proportioned in the exact ratio specified by the chemical manufacturer, and carried to the nozzle for discharge.

The Hayes Jet applies 10 gallons of mixed spray material per minute at gauge pressure of 500 pounds per square inch, or 6 gallons at 200 p.s.i. It is capable of delivering 300 gallons of spray solution with each full loading of chemical in the 12-gallon concentrate tank. Or, it can be used to spray as little as 50 gallons. The adjustable nozzle provides sprays ranging from a fine, fog spray to a full force stream reaching up to 65 feet high.

•

Jamieson Filter System

A new health protective system for sprayers of agricultural chemicals is being offered by Jamieson Laboratories, Van Nuys, Calif. Known as the Jamieson Whitecap model SU-1, the system provides complete above-the-shoulders protection for the worker.

In operation, the system's primary screen takes out all large particles from the air, which then is conducted through a three-stage filtration system. The Jamieson centrifugal filter/blower here discharges the majority of other particulate matter, and is self-cleaning. The air then passes through an additional fine particle filter, which removes particles to one micron, and then to a special filtration cartridge before entering the fiberglass helmet.

AG CHEM PEST ROUNDUP

by Kelvin Dorward

This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Mr. Dorward is head—Survey & Detection Operations, Plant Pest Control Division, U. S. Department of Agriculture. His observations are based on latest reports from collaborators in U.S.D.A.'s pest surveys throughout the U. S.

European Corn Borer Causes Concern In Some Areas

THE European corn borer was of concern in some areas during late August. In the Hudson Valley of New York, moths were abundant and larvae up to the fifth stage were readily found in about 5 per cent of untreated sweet corn silks and ears. Second-brood larvae remained the major pest of ear corn in the area. Egg masses and larvae increased in New Jersey due to heavier adult flights in early August. Moth flights increased in Wisconsin in areas where a second generation was developing. In some areas of the State, treatments for second generation larvae were underway.

Third-brood larvae of the European corn borer were active in southeastern Missouri by late August. Due to the late season, it was expected that considerable corn will be damaged. The borer was heavier than normal in the Upper Arkansas River Valley area of Arkansas. A moderate infestation was observed on grain sorghum in the Tennessee Valley area of Alabama. In Payne County, Oklahoma, one corn stalk was found infested out of 108 examined. Six larvae and one pupae were present.

Surveys during early August in North Dakota showed first-generation European corn borer infestations to be less severe than anticipated. Light second-generation emergence was experienced in southern Minnesota, but the number of borer counts in stalks was higher than in 1960 in the west central district of the State.

Although the spotted alfalfa aphid was generally light, it was reported active over a wide area in August. The insect was reported from a number of counties in Nebraska, Kansas and Oklahoma, but counts were all low. In one section of Colorado, the highest counts were 600 aphids per 100 sweeps. Controls were necessary on alfalfa in Chaves County, New Mexico, but populations in Arizona remained relatively low.

Some controls were necessary for the aphid in San Luis Obispo County, California. In Nevada, widely scattered light infestations were found. In Oregon, reports were received from several counties and controls were applied near Jacksonville, Jackson County, with excellent results. Populations of the insect increased from 2 to 20 per sweep in one southwestern Elmore County, Idaho, field. The aphid was also recorded from several other Idaho counties.

During late July and early August, the apple maggot was of concern in several states. It was necessary to repeat controls for the insect in Vermont, and protection was needed for all varieties of apples in Massachusetts. In Connecticut, controls were recommended for all orchards. Mites were a problem in some states during August. In Clinton County, New York, populations were building up in orchards where controls had not been applied for two weeks. Mites were still a problem in some Massachusetts and New Jersey orchards by mid August. The season was favorable for population buildups in California, and many hosts over the state were severely damaged.

The Mexican bean beetle was found in August in home gardens in the city of Boise, Idaho. This is the first infestation of the insect in the southwestern part of the State. Surveys showed scattered infestations throughout a one-mile-square area in the northwestern sections of the city. Delimiting surveys were to continue and eradicative measures were initiated. No infestations have been found in commercial bean fields west of Boise. During August the insect caused damage to lima beans in New Jersey and was on the increase in New York. Heavy populations were also reported from Delaware and Maryland. Beans were also damaged in home gardens of several New Mexico counties.

Boll weevils heavily damaged untreated or poorly treated cotton in the eastern half of Texas. Many extremely late-planted fields will not produce blooms because of the heavy populations. In Oklahoma, populations were on the increase, and in Missouri, 31 of 632 fields scouted were found infested. Missouri fields had from 1 to 35 per cent of the squares infested.

Third-generation weevils were emerging in most areas of Arkansas by late August. Infestations generally ranged from 0 to 25 per cent, but a few fields in the central and eastern sections had infesta-

tions of over 50 per cent. Controls have been giving generally excellent results. Considerable damage was occurring throughout the southern tier of Tennessee counties. Although the infestations, generally, were not overly high, in the Tallulah, Louisiana, area, some fields were being badly damaged.

Infestations of the boll weevil were erratic in the delta counties of Mississippi. Some fields had counts of over 90 per cent and it appears young cotton will need protection well into September if maximum yields are to be obtained. Populations were on the increase in most sections of Alabama, especially in untreated fields. Increases were also reported from South Carolina and controls were a necessity to protect the bolls. In the Piedmont area, average per cent infestation in untreated fields was 60 compared with 19 in treated fields.

Economic populations of the bollworm were reported from Arizona, central and north central Texas, Oklahoma, Tennessee, and Louisiana.

The spruce budworm was reported to be infesting about 760,000 acres of mixed conifer stands on Federal, State, and private forests in the northern area of New Mexico in early August. Larvae of the pine tussock moth were infesting more than 60,000 acres of jack and red pine in Bayfield and Douglass, Counties, Wisconsin.

Aerial surveys conducted during July revealed more extensive areas of defoliation by the gypsy moth in Massachusetts, Vermont, and Maine in 1961 than in 1960 and less in New Hampshire. In Massachusetts, about 500 acres were defoliated on Cape Cod and approximately, 500 acres in the western section of the State. In Vermont it was estimated at 8,000 acres, principally in Lake Dunmore, Sunset Lake, and Inman Pond sections, on several ridges in Monkton and East Charlotte vicinity, and west of Bellows Falls. In Maine, extensive areas of defoliation occurred in the vicinity of Waterboro in York County, on Mount Desert Island in Hancock County, and in Cherryfield area of Washington County. Total acreage in Maine approaches 20,000. No extensive areas were observed in New Hampshire.

In the last issue of this magazine the face fly was reported from Wyoming for the first time. Additional counties found infested during August were Converse and Weston. Georgia counties reported for the first time were Towns, Union, Rabun and White Counties. Ransom was a new county record for North Dakota as was Scotts Bluff County for Nebraska. New county records for Kansas were Geary, Lyon, McPherson,

(*Continued on Page* 88)

AG CHEM LISTENING POST

by Paul Miller

This department, which reviews current plant disease problems, is a regular feature of AGRICULTURAL CHEMICALS. The comments are based on observations of collaborators of the Epidemiology Investigations, Crops Protection Research Branch, USDA, Beltsville, Md.

Control of Powdery Mildew of Blueberry

IN THE Lake Michigan blueberry-growing area, powdery mildew, caused by *Microsphaera alni*, of the highbush blueberry, *Vaccinium corymbosum*, sometimes appears in early July and, in recent years, it has been found by mid-July in almost every blueberry plantation. J. E. Huguelet, Robert H. Fulton, and M. A. Veenstra (1), of Michigan State University, tested several standard powdery mildew fungicides for effectiveness in controlling the disease. Sulfur, 2 - (1-methylheptyl) - 4,6-dinotrophenyl crotonate (Karathane), and cycloheximide, in that order, were more effective than the other fungicides. Addition of a suitable spreading agent was essential for control. Leaf infection was the standard by which the treatments were judged.

Cotton-Seedling Diseases

According to Charles R. Maier (3), of the New Mexico Agricultural Experiment Station, seedling diseases of cotton annually cause losses amounting to 2 to 2.5% of the potential cotton crop in New Mexico. The loss in 1959 was estimated at $1,350,000. The seedling disease complex involves several soil-inhabiting fungi. Maier listed *Rhizoctonia solani*, *Thielaviopsis basicola*, and *Fusarium* spp. as the responsible fungi in New Mexico. In control investigations over a number of years, in-the-furrow application of various fungicidal materials had given promising results. In 1959 and 1960 Maier compared 17 chemicals and chemical combinations for effectiveness as in-the-furrow treatments, and also compared various methods of application to determine the most efficient. The most effective materials were PCNB, PCNB plus captan, captan plus *N*-trichloromethyl thiophthalimide (Phaltan), and thiram. Low-volume sprays gave better results than in-the-furrow dusts or planter-box dusts. As compared with dusts, low-volume sprays provided better disease control, produced higher yields of lint, favored rapid germination because of the immediate supply of moisture with the spray, and led to earlier maturity of the bolls. Maier concluded that in-the-furrow application of fungicides was an effective means of controlling cotton-seedling disease, and that its use also would be economically practical, since returns from the treatment would amount to 6 to 10 times the cost of application.

An Experimental Nematicide

Results of greenhouse and laboratory tests of *O,O*-diethyl *O*-2-pyrazinyl phosphorothioate (Cynem, American Cyanamid 18-133) for nematicidal activity against the root-knot nematode *Meloidogyne incognita* var. *acrita* were reported by R. E. Motsinger (4), of the University of Maryland Agricultural Experiment Station. In greenhouse tests, tobacco seedlings were used as the test plant and the chemical was applied before planting, at planting, and after planting. Excellent nematode control resulted regardless of time of treatment. Seedlings were stunted in all treated soil for the first 2 weeks after planting, and leaves developed necrotic lesions except in plots treated after planting. The plants recovered, however, and equalled untreated plants in size 38 days after planting. Aphids fed on tobacco plants growing in treated soil were killed; apparently the nematicide was absorbed by the roots and translocated throughout the plant. Residual effect of the chemical was long lasting. Nematodes in infested soil were effectively controlled for at least 12 weeks after soil treatment. Laboratory tests indicated that solutions of 1000 parts per million of Cynem killed larvae and eggs of the nematode. At lower concentrations, larvae were inactivated but not killed. No eggs hatched while egg masses were immersed in solutions of Cynem, even at the lowest concentration used, 0.1 ppm.

Powdery Mildew of Roses

Brian M. Jones and H. G. Swartwout (2), of the University of Missouri, applied soil drenches of the semicarbazone derivative of cycloheximide to potted young rose bushes in a study to determine whether the material possessed systemic action against rose powdery mildew. Three days after the plants were treated the leaves were inoculated with spores of the powdery mildew fungus. Effectiveness of systemic action was determined by incidence of leaf infection. Partial control was obtained with concentrations of 2.5, 5, and

(*Continued on Page* 90)

Arcadian® News

Volume 6 | Nitrogen Division, Allied Chemical Corporation | Number 10

ANNOUNCING two new ARCADIAN® Solutions for producing premium-grade fertilizers —

DURANA® 40

CHEMICAL COMPOSITION %							PHYSICAL PROPERTIES		
Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Formaldehyde	Water	Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60° F	Approx. Vap. Pres. at 104° F per Sq. In. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
37.0	14.6	29.0	32.0	16.0	8.4	7.87	1.198	0	36

U-A-S® F

40.0	26.0	0	40.0	16.0	18.0	13.0	1.051	24	55

DURANA 40 and **U-A-S F** are new and different ARCADIAN Nitrogen Solutions created for fertilizer manufacturers who wish to produce premium-grade complete fertilizers containing slowly-available, water-insoluble organic nitrogen. Through the proper use of these solutions in manufacturing complete fertilizers —

— approximately 40% of the total nitrogen from DURANA 40 is converted into water-insoluble methylene urea (ureaform) nitrogen.

— approximately 37% of the total nitrogen from U-A-S F is converted into water-insoluble methylene urea (ureaform) nitrogen.

This conversion to organic nitrogen takes place in the process of producing the fertilizer. In addition to organic nitrogen (methylene urea), complete fertilizers made with DURANA 40 also contain nitrate and ammonia nitrogen, and complete fertilizers made with U-A-S F also contain ammonia and urea nitrogen.

The agronomic value of these forms of nitrogen in complete fertilizers is well established. DURANA 40 and U-A-S F are particularly adapted to the production of premium grades, such as lawn and garden fertilizers and specialty fertilizers for crops such as tobacco, etc. Both of these solutions have been successfully tested.

In addition to supplying desirable forms of nitrogen, DURANA 40 and U-A-S F help give fertilizers excellent

(continued on following page)

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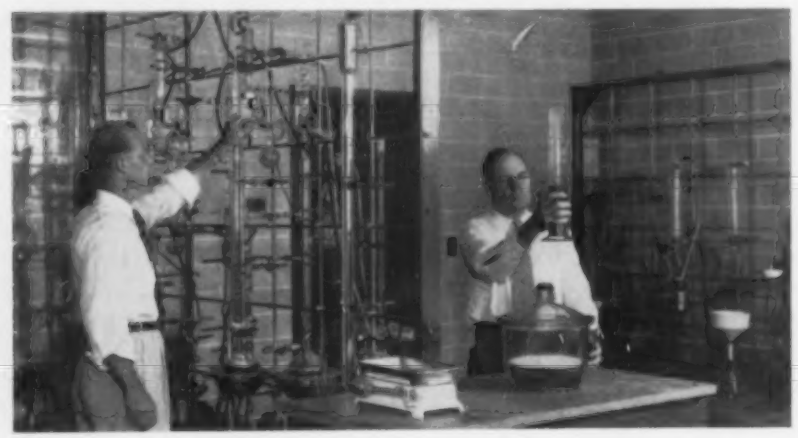
mechanical condition and facilitate the production of granular-type fertilizers. Each solution is ideally suited to the production of high-analysis fertilizers in ratios of 1-1-1, 2-1-1, 3-1-1 and higher nitrogen ratios.

You do not need to buy new equipment to use DURANA 40 or U-A-S F Nitrogen Solution. These new solutions are as easy to use through your existing equipment as your regular ammoniating solutions.

It will pay you to start now to produce premium-grade fertilizers containing slow-release (methylene urea) nitrogen, by using DURANA 40 or U-A-S F. These two new solutions are produced and sold exclusively by Nitrogen Division, Allied Chemical Corporation. They are products of Allied Chemical research – the same research that originated nitrogen solutions for ammoniating superphosphate more than 30 years ago. Through the years, this continuing research has brought you many new methods and materials for making better fertilizers. For information about DURANA 40 and U-A-S F and other ARCADIAN Nitrogen Products, contact Nitrogen Division, Allied Chemical Corporation.



Tips to Help You Get Accurate Formulation

Does the nitrogen content of your high-analysis fertilizers sometimes fail to meet minimum guarantees, despite the fact that you are using plenty of nitrogen in formulation? Are you forced to resort to excessive formulation to obtain your guaranteed nitrogen content? Have you detected the pungent odor of ammonia emerging from the exhaust pipe on the roof of your plant?

If you are faced with the problem of loss of nitrogen in ammoniation, it will pay you to take a careful look at your equipment and your methods.

In manufacturing pulverized or granular high-analysis fertilizers by batch or continuous mixing, failure to obtain the desired nitrogen content is often due to poor combination of ammonia with superphosphate and any added acids in the mixer.

Uniform distribution of the acid throughout the mass is just as important as uniform distribution of the ammoniating media. Uniform distribution insures effective utilization of all ingredients.

Efficient maintenance and use of correctly-designed distribution pipes are essential to uniform distribution of the acid and the ammoniating media. Correct techniques of operation must be observed to derive full value from your equipment.

A distribution pipe is basically a metering manifold and accuracy of metering ingredients is vitally important. This accuracy can be destroyed by corrosion and abrasion of the pipe. Corrosion and abrasion are cumulative and may pass unnoticed in their early stages unless a careful checking procedure is diligently maintained.

Improper use of acids and ammoniating media often causes the formation of many large particles too early in the ammoniation stage. This seriously limits further ammonia take-up by the superphosphate. Some of the unreacted acid may be buried inside these particles. Addition of more acid aggravates the situation and is a costly way of handling the problem. In extreme cases, it may also be dangerous.

Important Checkpoints

When your analyses indicate a loss of nitrogen in the ammoniation process, your first checkpoints should be: 1) Is your manpower efficient? 2) Are you using the proper distribution pipes and are these maintained in the best possible operating condition? 3) Are your formulation techniques correct for the fertilizers you wish to produce? 4) Are you using the ammoniating solution best suited to your methods and equipment?

Occasionally, loss of nitrogen occurs in the dryer. This may be due to excessive firing of the furnace as a result of poor installation or poor maintenance of the dryer. It may also be caused by forcing equipment beyond its capacity during periods of peak output.

In storage, there is seldom any appreciable loss of nitrogen from conventional formulae. When this does happen, a thorough appraisal of every phase of production should be made immediately.

Ask Nitrogen Division

When you have a formulation or an ammoniation problem, it will pay you to get the advice of a Nitrogen Division, Allied Chemical, technical service man. These men have a thorough knowledge of the entire operation of a fertilizer plant. They often assist in the selection of equipment and in the suggestion of more efficient, money-saving methods all along the production line.

This service is available to Nitrogen Division customers without charge. Get the facts from your Nitrogen Division salesman...or contact Nitrogen Division, Allied Chemical Corporation, 40 Rector Street, New York 6, N. Y. Phone: HAnover 2-7300.

NOTE: The information furnished in this issue of the ARCADIAN News is obtained from studies and tests considered reliable; results, however, are not guaranteed.

Arcadian News for Fertilizer Manufacturers from Nitrogen Division, Allied Chemical

Fifty percent earlier harvest of pulpwood from fertilized forest land than from unfertilized land provides a strong reason for forest fertilization.

Forest Fertilizer Know-How Beginning to Pay Profits

Fertilizing forest trees to get a bigger and faster harvest of pulpwood, timber and other wood products is now being practiced on a small scale in many states. It is the newest method of making wood production catch up with demand.

Increased planting of forest trees has been some help but, slow growth on poor soils, insect and disease damage and forest fires have been major detriments. Forest fires alone ruin trees on an area of 23 million acres a year, an area equal to the entire state of Indiana. We now have 489 million acres of commercial forest land and an annual growth rate of only 47 million board feet. Much of this land is not producing any appreciable growth worth harvesting. In 40 years, it is estimated we will need 80 to 100 million board feet a year.

Aerial Application

The first aerial application of mixed fertilizer to forest lands in this country was by Allied Chemical Corporation, in cooperation with Rutgers University, in 1956. This was used on a red pine stand on poor soil, and the fertilizer has greatly improved the growth and health of the trees. In Europe, Japan and other areas where wood is scarcer and more valuable than here, forest fertilization has been practiced for years. Fertilizer tests are now being conducted in many states of this country by state colleges, the U.S.D.A. Forest Service, and by pulp and lumber companies. Aerial application now makes it practical to fertilize standing timber quickly at a low cost of 1 to 2 cents per pound of fertilizer applied. Most applications have been at rates of 100 to 400 pounds per acre.

Market Potential

Forest tree nurseries are already using fertilizer, both to speed growth of seedlings and to produce sturdier planting stock that survives transplanting better. Lumber companies are finding that fertilization improves seed production and helps improve natural re-seeding as well as seed production for nursery planting. Pelleted fertilizer, for use in planting small trees, is also helping to make new plantations get a faster start.

The biggest single fertilizer market is standing timber. Trees need the same nutrients as other crops, though not as large a quantity. The best low-cost results will come from aerial application of fertilizer to trees growing on poor sandy soil, on badly leached or eroded soil in heavy rainfall areas, on land lacking humus, or where humus such as leaf cover on the soil is not rotting down into active form. Poor, burned-over, spoil-bank or cut-over land that is bare or has a weak "second-growth" will benefit greatly from fertilizer. When you consider that a large part of our forest and farm woodland is on soils not good enough for any other crop, you can see that there is a huge potential for fertilizer use. Estimates show that fertilizer can bring pulpwood stands to market within 20 years instead of the typical 30 years without fertilizer. On the other hand, slow-growing hardwoods of the Northeast—where investment is tied up for 40 or 50 years, and where close annual rings improve lumber quality for special markets—are the least promising market for fertilizer.

Kinds of Fertilizer

Different kinds of trees require different fertilizer ratios, and the same trees on different soils require different analyses. Nitrogen is essential in most forest fertilizer programs. In fact, nitrogen alone has worked well for increasing seed production of such trees as Douglas Fir. On sandy soils, potash is essential for most types of trees, and phosphorus is needed for new plantings of trees on most forest soils. The specific points on how to fertilize trees for profit are being worked out, but the answers aren't all in. Likewise, the number of fertilizer applications that pay on a tree crop before harvest still needs clarification.

It is not too early to stimulate forest fertilization in your sales area. The market is just ahead, and alert fertilizer men who take an interest in forest fertilization will capture this market. The demand for tree products keeps growing, and most forest soils lack sufficient plant food nutrients to produce the most profitable wood products.

Forest tree nurseries use large amounts of fertilizer.

The best N for your N-P-K

Arcadian® NITROGEN SOLUTIONS

	CHEMICAL COMPOSITION %							PHYSICAL PROPERTIES		
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water	Nitrate N of Total N (%)	Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60°F	Approx. Vap. Press. at 104°F per Sq. In. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
NITRANA®										
2	41.0	22.2	65.0	—	12.8	27.7	10.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	27.8	10.8	1.147	18	15
3	41.0	26.3	55.5	—	18.2	23.6	12.8	1.079	17	–25
3M	44.0	28.0	60.0	—	12.0	23.9	12.7	1.083	25	–36
3MC	47.0	29.7	64.5	—	5.8	24.0	12.6	1.089	34	–30
4	37.0	16.6	66.8	—	16.6	31.5	8.9	1.184	1	56
4M	41.0	19.0	72.5	—	8.5	30.9	9.2	1.194	7	61
6	49.0	34.0	60.0	—	6.0	21.4	13.9	1.050	48	–52
7	45.0	25.3	69.2	—	5.5	26.7	11.2	1.134	22	1
URANA®										
6C	43.0	20.0	68.0	6.0	6.0	27.7	9.3	1.180	12	39
6M	44.0	22.0	66.0	6.0	6.0	26.3	10.0	1.158	17	14
10	44.4	24.5	56.0	10.0	9.5	22.1	11.0	1.114	22	–15
11	41.0	19.0	58.0	11.0	12.0	24.7	9.2	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	19.7	11.7	1.087	25	– 7
13	49.0	33.0	45.1	13.0	8.9	16.1	13.5	1.033	51	–17
DURANA® (contains 8% formaldehyde)										
20	37.0	13.3	53.4	15.9	9.4	25.3	7.2	1.235	0	36
U-A-S®										
A	45.4	36.8	—	32.5	30.7	—	16.2	0.932	57	16
B	45.3	30.6	—	43.1	26.3	—	13.5	0.978	48	46
ANHYDROUS AMMONIA	82.2	99.9	—	—	—	—	24.3	0.618	211	–108

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Columbia 1, S. C., 1203 Gervais St.....Alpine 3-6676
Atlanta 3, Ga., 127 Peachtree St., N. E. Jackson 2-7805
Memphis 9, Tenn., 1929-B South 3rd St. Whitehall 8-2692
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"A NEW INQUIRY CARD SERVICE

Please direct to my attention
☐ more data ☐ prices ☐ a representative
on the centrifugal mixer.

NAME .....

COMPANY .....

ADDRESS .....

CITY AND STATE .....

an inquiry from Agricultural Chemicals

10/61

Please direct to my attention
☐ more data ☐ prices ☐ a representative
on the carliner for fertilizer cars.

NAME .....

COMPANY .....

ADDRESS .....

CITY AND STATE .....

an inquiry from Agricultural Chemicals

10/61

Please direct to my attention
☐ more data ☐ prices ☐ a representative
on the new bag scale, model E50-10B.

NAME .....

COMPANY .....

ADDRESS .....

CITY AND STATE .....

an inquiry from Agricultural Chemicals

10/61

Please direct to my attention
☐ more data ☐ prices ☐ a representative
on the liquid fertilizer plant.

NAME .....

COMPANY .....

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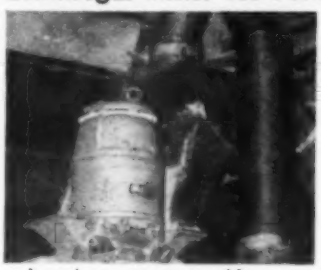
CITY AND STATE .....

an inquiry from Agricultural Chemicals

10/61

Centrifugal Mixer for Pesticide Blending



The centrifugal mixer homogenizes free-flowing dry mixes and slurries on either a continuous or batch basis. In addition to providing high-intensity blending and uniform dispersion of pesticide toxicants and diluents, the impact action of these mixers shatters nodules and agglomerates to provide a smooth textured product.

Capacity, 1 to 25 tons per hour, with motor options from 2 to 75 hp.

Carliner Reduces Bag Damage in Shipment

Extra protection for shipment of fertilizers in multiwall bags is obtained by lining railroad cars with this tough, springy, non-collapsible car liner. It stands up to vibration, cutting down damage from abrasion and chafing; it smothers splinters, nails, staples and other harmful hazards; it prevents the load from shifting when freight cars are coupled or bumped. The non-collapsible flutes grip both load and floor. This liner comes in rolls up to 72" wide and in sheets cut to size.

High Speed, Accuracy in New Bag Scale

Designed specifically for the fertilizer industry, this scale incorporates features providing high-speed bagging with exceptionally constant accuracy and freedom from corrosion.

The scale weighs up to twenty-four 50-lb. bags, or twenty 80 or 100-lb. bags per minute.

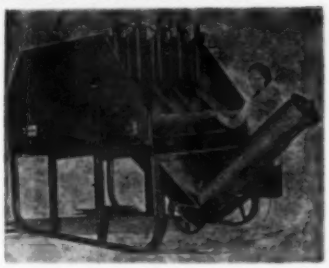
An air-operated catch gate built into the feeder prevents material dropping from feeder at completion of weighing cycle.

Liquid Mixed Fertilizer Processing Plant

Continuous or batch operation is featured in this compact Autobatch Skid Plant. Operated batchwise, the operator can select any batch size from one ton to five tons of complete analysis mixed liquid. Continuous operation can be set up for any base solutions materials (1:3 ratio) or combination of nitrogen-phosphate numbers. Capacity 6 tons, normal operating capacity 5 tons.

NO POSTAGE · NO DELAY, MAIL NOW!"

Self Contained Automatic Fertilizer Plant



Self contained plant readily installed, delivers one ton of fertilizer every three minutes.

The Blend-O-Mixer is 17′ x 5′. Ratio of ingredients is controlled by an electric timer. Freight handling costs are cut to minimum on raw materials shipped directly from the mines. Hopper cans — automatically unloaded by tubular conveyor. Storage in five 100-ton capacity bins.

Please direct to my attention
☐ more data ☐ prices ☐ a representative
on the automatic fertilizer plant.

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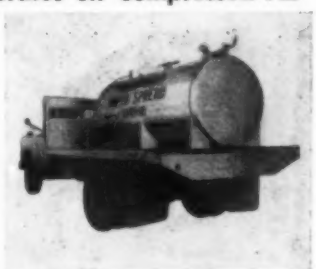
Liquid Spreader Operates on Compressed Air



Capacity of standard unit, 1000 gallons — discharge is in the form of droplets rather than mist, minimizing drift loss. Fertilizer does not sludge or salt out in cold weather because compressed air process agitates liquid contents.

Unit is designed for mounting on regular flat bed truck or wagon. Mounting time about 10 minutes, weight approximately 1380 lbs. for standard units.

Please direct to my attention
☐ more data ☐ prices ☐ a representative
on the liquid fertilizer spreader.

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Dry Wetting Agent for Pesticide Formulation

Available as a 98% free-flowing powder that blends easily with ordinary mixing equipment. It will have a "conditioning effect" upon the end product to prevent lumping and balling.

This product is quickly soluble,—even in cold water—is stable under all conditions of pesticide formulation and usage. It is not affected by any pH and is compatible with organo-phosphorus sulfur and metallic base pesticides, fungicides, weed killers etc.

Please direct to my attention
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on the dry powder wetting agents.

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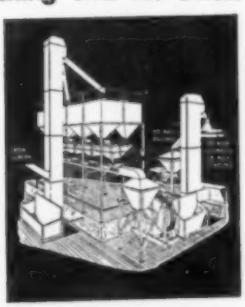
CITY AND STATE .....

an inquiry from Agricultural Chemicals 10/61

Batching Unit for Small or Large Plant



This compact unit takes only a few inches more space than an ordinary bagging machine. It can be set to produce at any rate from a few tons per hour to 100 tons per hour. Settings for changes of analyses can be made easily and quickly.

Automatic, minimum labor requirement to operate.

Please direct to my attention
☐ more data ☐ prices ☐ a representative
on the batch weigh system.

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an inquiry from Agricultural Chemicals 10/61

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AG CHEM

Fertilizer Views and News

by Vincent Sauchelli

Dr. Sauchelli is a Consultant to the Agricultural Chemicals Industry.

The Importance Of Food Surpluses In A Nuclear War

DID you know that about 16 million Americans depend upon our agriculture for their regular paycheck? These are the people who make, ship, and sell farm machinery, fertilizers, pesticides, fencing, building materials, generate and transmit electric power, refine petroleum and process rubber into tires. They also include the vast army engaged in processing food products and in marketing them throughout the nation; in cotton and woolen mills; in the transportation industry; and in warehousing and distributing raw and processed farm products. Our agriculture is industrialized. Our farmers spend about $26 billion a year for such equipment, goods, and services. Although only 7 million families comprise our present farmers and farm workers, we 183 million Americans depend upon them for the food we consume, most of the clothing we wear, and for the wood products in our homes and buildings.

This dependence upon our agriculture for our daily needs in food, and agriculture's dependence upon the chemical and equipment industries has been dramatically brought home to us by the crisis in Berlin created by the suppressive measures of the East German Communists. And, more to the point, the problem of farm surpluses comes in for serious consideration.

In the event of a nuclear war, would the current surplus in food grains be an asset or liability? The answer is all too obvious. As mentioned above, our agriculture is industrialized; it is thoroughly mechanized. Without chemical fertilizers, pesticides, tractors, combines, rubber tires, trucks, milking machines, electric and gas power and so on, our major farms would be paralyzed. If war were to come, isn't it reasonable to assume that the enemy would aim their nuclear fury on our concentrated industrial centers? And it follows that by destroying this country's industrial plants, the enemy would seriously cripple, if not altogether paralyze, our agricultural plant. The problem of food surplus in such an event would easily solve itself.

Recently, Dr. P. R. Stout, an eminent scientist in California, proposed that farmers should be induced to employ all their facilities to produce top-level quantities to supply minimum national needs for one to two years; furthermore, that the federal government should find appropriate storage for the surplus. This garnering of foodstuffs should be as much an integral part of Civic Defense as any of the other phases now advocated by the authorities.

Let me repeat: If a nuclear attack were to destroy our industrial plant, our agriculture would be very seriously handicapped if not altogether paralyzed. Restoration of facilities to somewhat normal would require one or two years. Meanwhile, where would our food and fiber supplies come from? The old slogan "an ever normal granary" did make sense. A cache of food stuffs established in every city and town as an emergency measure, as advocated by Dr. Stout, is not fanciful. It is quite certain that in the emergency of total war, it will be the people in our urban centers and not the farmers who will suffer most from want of food.

Famers find it hard to adjust total production to demand. Unlike manufacturers who can control production more or less with prospective demand, farmers comprise too many small units, each of which does not produce enough to influence the market. If prices are good, the individual farmer is induced to produce more. This tends to create surpluses. We learn, however, from the U. S. Department of Agriculture that the average annual stock accumulation for the 30-year period (1930-1959) was less than 2 per cent of total farm and ranch production *less* consumption at home and exports. For feed and food grains and for cotton, the annual average accumulation during the 5 years 1955-59 has been nearly 7 per cent. The Government is paying for the storage, transportation and interest on stocks of farm products at about $1 billion a year. This is, in a way, insurance against a possible food shortage. It is conceded that the amounts of wheat and feed grains are now in excess of needs for a possible emergency. The Congress is struggling hard to formulate a farm program that should significantly reduce the annual production of wheat and feed grains. But the reserve in food and fiber advocated by Dr. Stout is something else. It is a reserve that most taxpayers will endorse and

(Continued on Page 81)

Why do fertilizer packers use more I&C multiwall bagging equipment than any other make?

Over 1000 Union-Camp I&C installations have been made in the last six years. Here are 8 reasons behind their astonishing popularity.

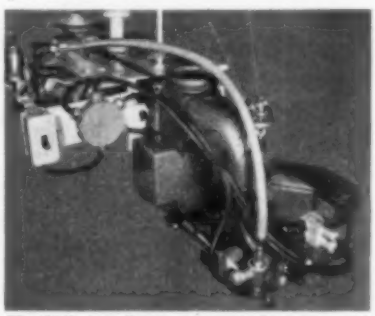
1. Reduced Packaging Costs. I&C's pay for themselves. Their fast, *automatic* operation reduces packaging and labor costs, increases profitability. Dozens of repeat orders attest to their efficiency and economy.

2. 20-a-Minute—and More. The Union-Camp I&C Bagger was the first machine to introduce high-speed filling of open-mouth multiwall bags. Speeds well in excess of 20 bags per minute can be sustained, depending on the flow of the product.

I&C V-Type Sewing Conveyor. Fixed chain brackets eliminate need for rollers. This means no freeze-ups, fewer breakdowns.

3. Outstanding Flexibility. With the versatile I&C, you can make weight changes from 25 to 200 lbs.—with just a turn of a scale dial knob! No bag clamp is necessary.

4. Accurate. The I&C *automatically* pre-weighs the net amount of material before it is dumped in the bag. At speeds of 20 bags a minute and more, weight variation is within *plus or minus 2 ounces* on 100 lb. packages of uniform granular or pelletized products.



The I&C Acto-Cutter automatically starts and stops sewing action and cuts threads between bags. An outstanding time and labor saver.

5. Low Maintenance. Simplicity of design is a major feature of I&C equipment. Another is sturdy construction. Many packers report low maintenance cost a key factor in their selection and repurchase of I&C bagging equipment.

6. Cuts Production Time—Speeds Service. With the I&C you can bag and ship required tonnages faster. There is usually little or no downtime. Thus you speed customer service and delivery, reduce costly overtime.

7. Labor-Saving Accessories. There is a wide range of machine models plus many cost-cutting auxiliaries. These include sewing machine lubrication systems, dual head sewing stand, automatic actuators and thread chain cutters—everything you need to streamline your multiwall bagging operation.

8. Valuable Survey Service. Union-Camp package machinery specialists make comprehensive surveys of your plant. They make up exact machinery and installation specifications and layouts. They train operating personnel, help determine the actual savings for your operation. All at no cost or obligation.

Newest I&C Bagger—the UB-101. Machine's features include dial scale which provides for instantaneous weight changeovers from 25 to 200 lbs. with a turn of a knob.

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AG CHEM

Washington Report

by Donald Lerch

Defense Buildup Will Help Agricultural Chemical Sales

THE nation's multi-billion-dollar defense buildup will have at least a minor impact upon agricultural chemical sales over the next few years.

The most immediate market will be for pesticides to protect wheat to be stored in and near 191 metropolitan areas as a hedge against disruption of normal food distribution in case of a nuclear attack.

Agriculture Secretary Orville Freeman tells us the wheat will be stored in bins both inside city areas and along perimeters 25 miles from the city cores. The large number of individual storage areas will create some additional market for protective chemicals. In addition, it will give the pesticide industry a new opportunity to impress the public with the contributions pesticides make to the public welfare—in this case, contributing to our chance of survival in the event of a nuclear attack.

The buildup in Civil Defense preparations also is expected to create additional markets for pesticides used in protecting public health against insect and rodent-borne diseases. In past catastrophies, more lives have been lost to disease following the disaster than to the disaster itself. Such losses of life can be minimized by having supplies of pest control chemicals stored in easily available locations and by having Civil Defense personnel trained in their proper use.

Incidentally, you can discount complaints that stored wheat will be of little food value unless milling and baking facilities also are available. Secretary Freeman assures us that wheat can be boiled and consumed without processing. He has eaten wheat so prepared. While not in a class with filet mignon, it does provide nutrition in an emergency.

Progress Is Rapid

Agriculture is moving ahead at a rapid pace. USDA Economist Nathan Koffsky says that of all the progress in the past 100 years, 70 percent has taken place in the past 20 years, and 50 percent in the past 10 years.

Much of this gain is due directly to the wider use of fertilizers and pesticides. The chemicals produce and protect the higher yields which make use of high-capacity modern farm machinery really pay out.

Talk to an old-timer and you really get a look at how far we've come. Edward C. Hooks, now 85, who started farming in Arkansas in 1906, says cotton raising was a one-man, two-mule operation. Now, his son, Lance Hooks, a public information officer in USDA, tells other farmers about modern farm practices and programs.

Water Policy Committee

Never before has there been so much official concern over our land and water resources. Agriculture Secretary Freeman has just appointed a Land and Water Policy Committee. The Department of Health, Education and Welfare has had people working, particularly in the field of water pollution, for some time.

Non-government groups, such as the National Wildlife Federation, Izaak Walton League, and League of Women Voters, are concentrating more of their attention on this field.

The USDA's interest, according to Dr. O. J. Scoville, a USDA economist and secretary of the new Land and Water Policy Committee, is to provide an overview of present and future land, forest and water resources and give program recommendations for the future.

One area of investigation will be land now being cultivated which is unsuited to cropping and should be used for non-farm purposes. Another is the threatening prospect of having much good farm land gobbled up by spreading highways, airports, industrial, and urban areas.

Recreation and wildlife use of land and water resources comes into the picture as well. A Presidential Committee, headed by Laurence Rockefeller, has been working on outdoor recreation resources for some time. And, wildlife groups are girding their loins for a wider attack against pollution of streams, lakes, and rivers.

Some of the latter are adopting a comment by Dr. George J. Wallace, of Michigan State University, —"The current and ever-expanding pesticide program poses the greatest threat that animal life in North America has ever faced" — as a slogan, despite the fact that such statements have been discredited time after time by the nation's most competent scientists.

Water pollution is an area in which fertilizer companies may

(*Continued on Page* 81)

MEETING CALENDAR

Oct. 2-6—National Hardware Show, McCormick Place, Chicago.

Oct. 4-6 — Southeastern Fertilizer Conference, Atlanta Biltmore Hotel, Atlanta, Ga.

Oct. 9-10 — Four-State Applicators & Chemical Conference, Chinook Motel and Tower, Yakima, Wash.

Oct. 9-11—Western Agricultural Chemicals Association, Annual Meeting, Hotel Claremont, Berkeley, Calif.

Oct. 12-13—Northeastern Fertilizer Conference, Schine Inn, Chicopee, Mass.

Oct. 16-18 — Entomological Society of Canada, Entomological Society of Quebec, Joint Meeting, Quebec, P.Q., Canada.

Oct. 16-20—Fertilizer Sessions, National Safety Congress, Pick-Congress Hotel, Chicago.

Oct. 20-22 — Eastern Lawn, Garden, and Allied Products Trade Show, Coliseum, New York.

Oct. 25-26 — Association of American Fertilizer Control Officials, Woodner Hotel, Washington, D.C.

Oct. 30-31 — Eastern Branch, ESA, Lord Baltimore Hotel, Baltimore, Md.

Oct. 29-Nov. 1 — National Agricultural Chemicals Association, 28th Annual Meeting, The Homestead, Hot Springs, Va.

Oct. 30-Nov. 1—National Fertilizer Solutions Association, Annual Convention, Edgewater Beach Hotel, Chicago.

Nov. 2-3 — Pacific Northwest Plant Food Association, annual convention, Hotel Gearhart, Gearhart, Oregon.

Nov. 6—South Carolina Plant Food Educational Society, Clemson House, Clemson, S. C.

Nov. 6-7 — Annual Weed Conference, Washington State Weed Association, Chinook Motel and Tower, Yakima, Wash.

Nov. 7-10 — British Insecticide & Fungicide Conference, Brighton, England. Sponsored by Association of British Manufacturers of Agricultural Chemicals.

Nov. 8-10—Fertilizer Industry Round Table, Mayflower Hotel, Washington, D. C.

Nov. 12-14 — 38th Annual Convention of California Fertilizer Association, Jack Tar Hotel, San Francisco.

Nov. 14-17—Mexican Assn. of Insecticides & Fertilizers Manufacturers, Hotel La Perla La Paz, Lower California, Mexico.

Nov. 27-30—Entomological Society of America, 9th Annual Meeting, McAllister Hotel, Miami, Florida.

Nov. 27-30 — American Society of Agronomy (Soil Science and Crop Science Societies included), Sheraton-Jefferson Hotel, St. Louis, Mo.

Dec. 5-7—National Aviation Trades Association, Annual Meeting, Washington, D. C.

Dec. 7-8 — Michigan Fertilizer & Lime Conference, Kellogg Center, Michigan State University, East Lansing.

Jan. 3-5—Northeastern Weed Control Conference, Hotel New Yorker, New York.

Jan. 17-19—Southern Weed Conference, Hotel Patten, Chattanooga, Tenn.

Jan. 18-19 — Arizona Aerial Applicators Assn., Safari Hotel, Scottsdale, Ariz.

Jan. 25-27 — California Aerial Applicators Assn., Hotel El Mirador, Palm Springs, Calif.

WHAT ARE YOUR FERTILIZER PLANT DESIGN REQUIREMENTS?

Dorr-Oliver has had 45 years' experience in the field of concentrated fertilizer production via the wet process of manufacturing phosphoric acid. Dorr-Oliver designs and builds complete plants.

Let us send an engineer to discuss your requirements.

PHOSPHORIC ACID

Dorr-Oliver designs plants for producing strong acid (32 to 33% P_2O_5) directly by its well-known process.

DIAMMONIUM PHOSPHATE BASED COMPOUNDS

Dorr-Oliver designs plants producing directly from 32 to 40% P_2O_5 phosphoric acid a wide variety of compounds such as 14-14-14, 14-28-14, 12-36-12, 11-48-0, 16-20-0 and 18-46-0 as hard, uniform, free-flowing granules based on mono or diammonium phosphates.

PHOSPHORIC ACID EVAPORATION

Dorr-Oliver designed vacuum evaporator stations eliminate serious scaling, reduce P_2O_5 losses to a negligible point and involve no fume problem.

NON-GRANULAR TRIPLE SUPERPHOSPHATE

Dorr-Oliver designs plants for producing a soft triple superphosphate with optimum characteristics for mixing and ammoniation.

AMMONIUM SULFATE FROM CALCIUM SULPHATE

Dorr-Oliver has successful experience in the use of by-product gypsum from phosphoric acid

MIXING AND GRANULATION

Dorr-Oliver designs plants for producing compounds in the form of hard, uniform, free-flowing granules from a variety of raw materials in solid or liquid form.

TRIPLE SUPERPHOSPHATE FOR DIRECT APPLICATION

Dorr-Oliver designs plants to produce hard, uniform, free-flowing granules by its own process requiring evaporation to only 38% P_2O_5 with no need for subsequent curing.

DORR-OLIVER

WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT

NEWS ABOUT THE AG CHEM TRADE

J. D. Shirley Joins CSC

Jack D. Shirley has joined the Agricultural Chemicals Department of Commercial Solvents Corp., New York.

Mr. Shirley previously was associated with Spencer-Kellogg & Sons, Inc. For 10 years he was an agricultural salesman for Swift & Company in Missouri. He will service CSC accounts in the four-state area of Missouri, Iowa, Kansas and Nebraska.

•

WACA To Hear Keating

Dan J. Keating, Stauffer Chemical Co., New York, will tell the Western Agricultural Chemicals Association "What's Right With Our Industry" at the group's annual meeting, Oct. 11, in the Hotel Claremont, Berkeley, Calif.

Also on the program is Louis A. Rozzini, California Farm Bureau Federation, who will tell "What Farmers Expect From the Pesticide Industry." L. B. McNelly, U. of California will speak on the topic "Can We Be Complacent?" Other speakers include Charles Paul, California Department of Agriculture, and Stuart W. Turner, consulting agrologist, San Francisco.

Chemical Control Conference To Be Held In Washington

A conference on chemical control procedures and problems in the fertilizer industry, sponsored by the Chemical Control Committee of the National Plant Food Institute, will be held in the Gold Room, Woodner Hotel, Washington, D. C., on October 25. Dr. Vincent Sauchelli, chairman of the Chemical Control Committee, said that the meeting has been scheduled for the day prior to the meeting of the Association of American Fertilizer Control Officials, which will be held in the same hotel in order to enable many of the chemists attending the other meeting to participate in the NPFI Conference.

Following introductory remarks by Dr. Sauchelli, the program calls for a talk on quality control in fertilizer manufacture by J. R. Archer, International Minerals & Chemicals Corp., East Point, Ga. C. H. Russell, Monsanto Chemical Co., St. Louis, will cover the NPFI's new detailed manual for sampling and analyzing liquid and solid fertilizers. R. Vance Ward, Canadian Industries Ltd., New Toronto, Canada, will present a report on practical applications of statistical quality control in the chemical industry.

Also on the program is a discussion by Dr. W. J. Youden, U. S. Bureau of Standards, Washington, D. C., on evaluating the accuracy of analytical procedures. The analysis of synthetic Magruder check fertilizer samples will be discussed by Dr. Charles W. Gehrke, University of Missouri, Columbia, Mo. Henry DeSalvo, head of the Feed, Fertilizer, and Pesticide Division, Little Rock, Ark., will speak about better relations through cooperation of the control officials and the fertilizer industry.

W. H. Hoffman, USDA, Beltsville, Md., and E. D. Schall, Department of Biochemistry, Purdue University, Lafayette, Ind., will cover a workshop on new phosphoric methods. In a general session at the conference, an open discussion will be held on quick methods of analysis for production control.

Boyd Heads Swift Division

J. G. Boyd has been named manager of Swift & Company's Agricultural Chemical Division at Greensboro, N. C. He succeeds W. H. Parker, who has been with the company for more than 48 years. Mr. Parker had been manager at Greensboro since May, 1946.

Mr. Boyd joined Swift in 1938 at South Norfolk, Va. After World War II, he became assistant auditor at Swift's Agricultural Chemical Division in Baltimore, Md. Subsequently, he held positions as auditor, office manager, and in sales at Norfolk, prior to his new assignment at Greensboro.

•

Northeastern Weed Meeting

The 16th annual meeting of the Northeastern Weed Control Conference will be held at the Hotel New Yorker, New York, January 3, 4, and 5.

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Baker Is U. S. Distributor

H. J. Baker & Bro., Inc., New York has been named exclusive distributor in the United States for Brockville Chemicals Limited of Maitland, Ontario. At the same time, H. J. Baker & Bro., (Canada) Ltd. of Montreal, was appointed exclusive distributor for Brockville in Canada.

Departure of first United States-bound tank car of nitrogen solutions produced by Brockville's new plant at Maitland, Ontario, is marked by company representatives. At left below is J. Morse Smith of H. J. Baker. With him are (left to right) J. Texhon, production manager, Dr. C. A. Vandendries, executive vice president, and B. T. Johnson, manager of sales and development, all of Brockville Chemicals.

NAC Lists Speakers

The National Agricultural Chemicals Association has released a tentative program for its October 29-November 1 meeting at the Homestead, Hot Springs, Va., that lists the names of speakers who will expound on various aspects of the theme for the meeting — Industry's Challenge: Progress or Complacency.

Among the speakers will be Dr. J. O. Rowell, extension entomologist, Virginia Polytechnic Institute, Blacksburg, Va.; Miss Willie Mae Rogers, director of the Good Housekeeping Institute, New York; and Dr. D. A. Spencer, research biologist for the Wildlife Research Center, U. S. Fish and Wildlife Service, Denver, Colorado.

Also on the program are: Dr. G. Herbert True, assistant professor of marketing at Notre Dame University, South Bend, Ind., and Miss Cathy Bauby and her program "Your Personality" (a luncheon feature intended for both men and women.)

A highlight of the meeting will come during the annual banquet when Abraham Ribicoff, Secretary of Health, Education, and Welfare, Washington, D. C., will be the speaker.

P. J. Reno, manager of the Agricultural Chemicals Division of Hercules Powder Co., Wilmington, Del., is chairman of the program committee for the convention.

•

Jones Joins Raymond

Frank Jones has joined the sales staff of Raymond Bag Corp., Middletown, Ohio. His headquarters are in Monroe, Louisiana.

•

Fertilizer Application Conf.

Research and development on improved fertilizer use and application will be discussed on the program of the Council on Fertilizer Application. The CFA meeting will be held November 27-30 at the Sheraton-Jefferson Hotel, St. Louis, Mo., in conjunction with the American Society of Agronomy and The Soil Science Society of America.

The program will include a discussion on "New Methods of Fertilizer Handling," by H. H. Tucker, Sohio Chemical Co.; D. R. Keim, Wilson & George Meyer; C. E. Austin, Smith Douglass; and Loren Johnson, U. S. Steel.

"Fertilizer placement and spacing for small grains" will be reviewed by L. S. Robertson, C. M. Hansen and H. J. Retzer, Michigan State U. and USDA. Univ. of California researchers, J. S. Lingle and B. A. Krantz, will report on "Predicting trace element deficiencies," while Ivan Stewart and C. D. Leonard, Univ. of Florida, will discuss "Correcting trace element deficiencies."

Other discussions will concern plant development and growth, diagnosing fertility problems, and a trace element survey report.

•

Fire Destroys Terre Plant

The Terre Co., Totowa, N. J., was destroyed by a fire last month which caused damage estimated at $150,000.

To Address Control Officials

Dr. R. C. Edwards, president of Clemson College, Clemson, S. C., will be among the speakers at the 15th annual convention of the Association of American Fertilizer Control Officials, Woodner Hotel, Washington, D. C., Oct. 25 and 26.

C. V. Marshall, Ottawa, Canada, president of the AAFCO, will open the meeting with a presidential address, after which Dr. Edwards will be heard and Dr. W. H. Garman, NPFI, will discuss fertilizers and our changing agriculture. Also to be discussed are trace elements and new legislation.

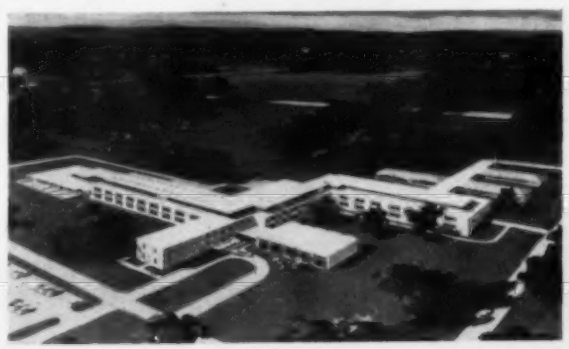
•

General Chemical Appoints

George N. Palmer has been appointed mid-Atlantic district field sales manager for agricultural chemicals by Allied Chemical's General Chemical Division.

He will supervise sales in New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia and West Virginia, with headquarters at Camden, New Jersey.

American Cyanamid Opens Princeton Research Center

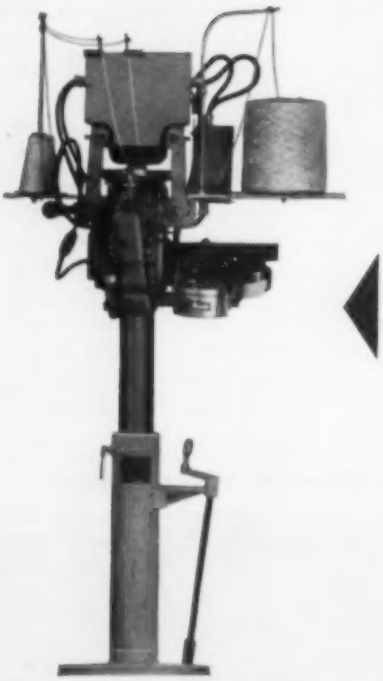


Architects drawing of the new American Cyanamid research center that was formally opened Sept. 25 at Princeton, N. J. The center is located on a 640-acre tract.

"The farmer's future rests in the hands of research people. Only a steady stream of new products from the laboratories will keep farm producers competitive," said C. D. Siverd, general manager of American Cyanamid Company's Agricultural Division, at the opening of the Cyanamid Agricultural Center Sept. 25. The Center is located near Princeton, N. J., on a 640-acre tract.

Mr. Siverd said that research efforts at the new center would be directed "as much along fundamental lines as they are toward immediate product developments. Only by encouraging constant probing on the frontiers of knowledge can we provide new areas for investigation."

The center is comprised of a research and development laboratory (the largest building at the center), an administration building, and a cafeteria building that will also serve as a meeting and conference site.



Bemis' new automatic Bag Top Printer assures you of clear, uniform printing above the sewing line of multiwall paper bags as they are being closed. It has an amazing number of applications for your business.

Use it to print product codes, specifications, data for shipping and handling identification, commodity analyses, product packaging date. And you can take it from there.

Mounted on a Bemis sewing pedestal, the Bag Top Printer shown at left imprints a bag as it is being sewn closed. In operation, an attendant simply leads the edge of the bag into the printing guide. The bag is then coded. An actuator starts the sewing head to sew the bag. The thread is automatically cut when the bag leaves the sewing head.

Power-driven, the Bag Top Printer uses a pre-inked roll that eliminates fluid inks, solvents, etc. Type, on a rotary print wheel, can be quickly changed.

For more information how a Bag Top Printer can help increase the efficiency of your packaging operation, just get in touch with us.

Bemis

where packaging ideas are born

General Offices:
408-L Pine Street,
St. Louis 2, Mo.

S. C. Group To Meet Nov. 6

The South Carolina Plant Food Educational Society will hold its annual meeting at the Clemson House in Clemson, South Carolina, on November 6.

•

Dow Names Greenfield

Dr. John E. Greenfield has been promoted to section head of agricultural chemicals market research for The Dow Chemical Co., Midland, Mich. He has been with Dow since October, 1957, as a market analyst.

•

IMC Training Clinics

For the fourth consecutive season, International Minerals & Chemical Corp., Skokie, Ill., is sponsoring a series of cross-country training clinics this fall for customer companies in the fertilizer industry.

The 1961 series, "Total Service Selling," takes the program back into sales training after the special production and technical meetings held last fall. The meetings originally were requested by fertilizer companies as an aid to management in providing continuous training specifically for salesmen in the fertilizer industry.

Completely new material and new approaches to quality selling and service selling have been developed.

William W. Chadwick, IMC's manager of merchandising, will direct the program and preside at all 9 meetings, which will open October 9 in Baltimore and close November 16 in New Orleans. The complete schedule:

Oct.	9-10	Baltimore (Lord Baltimore)
Oct.	11-12	Raleigh (Plantation Inn)
Oct.	16-17	Kansas City (Muehlebach)
Oct.	23-24	Indianapolis (Marott)
Oct.	25-26	Toledo (Secor)
Oct.	30-31	Minneapolis (Pick-Nicollet)
Nov.	1- 2	Macon (Dempsey Motor Hotel)
Nov.	13-14	Dallas (Marriott Motor Hotel)
Nov.	15-16	New Orleans (Royal Orleans)

Some things can't be shipped in this new bag

But they are the exception. For this is the new Balex™, West Virginia's rugged, single ply, economical shipping container for a host of commodities . . . in pockets or bulk.

With usual savings ranging from 8 to 12% (and even more depending on the type of container replaced), an increasing number of companies are using Balex to help solve the cost-price squeeze problem.

Balex solves other problems too. For example, The National Sugar Refining Company selected Balex as a master shipping container for their Jack Frost, Quaker and Godchaux cane sugars. In a check of 52 carloads shipped in Balex containers of 1/110# construction, damage was substantially less than with the 2/70# conventional kraft balers they replaced.

Balex containers are made from an extra-heavy Clupak* extensible paper, newly developed by West Virginia. Also available in wet strength, polyethylene coated, and embossed for extra nonskid protection.

For detailed information on Balex or Wonderwall Bags, write Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Avenue, New York 17, N. Y.

West Virginia Pulp and Paper

*Clupak, Inc.'s trademark for extensible paper manufactured under its authority and satisfying its specifications.

Agricultural Chemicals Research Discussed At Canadian Agr. Chemicals Assn. Meeting

THE ninth annual meeing of the Canadian Agricultural Chemicals Association was held, Sept. 17-20, at Mont Tremblant, Quebec. One of the featured speakers was Dr. Rosmarie Von Rumker, vice-president research and development of Chemagro Corp., Kansas City, Mo., who discussed Agricultural Chemicals Research and Development Policy," with particular reference to the limitations that are placed upon the North American producer of basic pesticides as a result of the extra testing and registration requirements which he must meet.

Dr. Von Rumker reviewed the very substantial costs which necessarily precede the development of any new pesticide, indicating that there is very little likelihood of recovering these heavy costs (which may run up into millions of dollars) unless the company has a good patent position. It is for this reason, she commented, that "there is little incentive for a commercial company to engage in such an effort on behalf of an unpatented public domain product. Likewise chemicals developed by tax-supported agencies have little chance of ever being fully developed unless they are patented, and unless a reasonable degree of protection and exclusivity can be offered to a prospective commercial developer."

She reported results of a recent survey made to determine how much more expensive it is to develop and register a new pesticide in the U. S. or Canada in comparison with elsewhere in the world, stating that of any pesticide development budget spent in North America only 60% goes to fulfill the basic requirements, while 40% is spent in fulfilling extra requirements which prevail in North America but not in other countries. This means that the North American manufacturer must be sure that his product will find a market large enough so he may recover his high research and development expenditures. His European competitor, by contrast, can more easily afford to develop different products for different uses. A further corollary of this general rule is that it is much more economical for the American manufacturer to obtain a large number of registrations for one product, rather than to register different products for many different uses.

The higher testing costs in the U. S. and Canada result from different policies underlying the pesticide registration policies in North America, and the balance of the world. Chronic toxicity is the consideration most heavily emphasized in the United States, and the basic concept apparently is that certain diseases are more serious than death. Abroad, the acute toxicity and handling hazard receive relatively more attention, and there is more incentive for manufacturers to develop pesticides of a lower order of toxicity.

Dr. Von Rumker commented, however, that despite the differing emphasis in United States and abroad, to the best of her knowledge "no harm to anybody has ever been demonstrated to result from the consumption of produce treated with pesticides in accordance with good agricultural practice, either in North America or elsewhere. . . . On the other hand, misuse resulting in accidents during handling and application seems to be a more likely hazard, especially where agricultural mechanization and the education of agricultural workers are not at a high level."

The net result of the higher cost of pesticide development in the North American market, she summarized as follows:

> North American pesticide manufacturers are at a disadvantage in competing in the export markets.
>
> We have fewer products available with which to combat the ever-increasing resistance problem.
>
> Products with a limited and specific spectrum of effectiveness which could be employed with no or minimal harm to beneficial insects do not have a good chance of being developed and used, because their potential market is usually limited.
>
> The development of "tailor-made," species-specific insecticides based on enzyme systems is discouraged, because each one would be too highly specific and have too limited a field of use.

Also featured on the program was a panel discussion, "Partnership in Pesticides — Government, University, Industry," in which the participants were H. A. Pass, technical director of Green Cross Products, representing industry, Dr. H. L. Patterson, director Economics Division, Ontario Dept. of Agriculture, representing government, and Professor F. O. Morrison, associate professor of entomology at McGill University, representing the universities. This panel discussion, which reviewed extension, marketing, testing, the spray calendar, and co-operation of the various agencies, will be reported in our next issue.

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Appointed By Allis-Chalmers

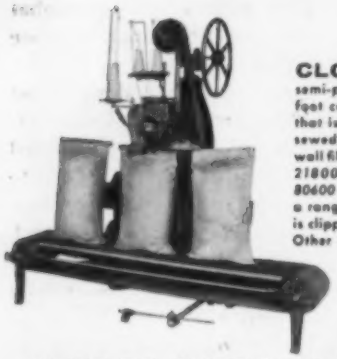
Will Mitchell Jr. has been appointed director of the research division of Allis Chalmers Mfg. Co., Milwaukee, Wisconsin. He had been acting director.

•

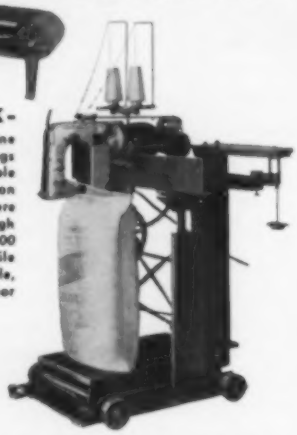
Huckman Named By Foxboro

Edward R. Huckman has been named general sales manager for The Foxboro Company, Ltd. He will have charge of all industrial instrument sales activities for the Montreal firm and its branch offices in St. John, Toronto, Sudbury, Port Author, Edmonton, Calgary and Vancouver.

What are Your BAG CLOSING PRODUCTION REQUIREMENTS?



TAPE BOUND CLOSURES? Here is a semi-portable unit *(left)* with a 5-foot conveyor and the sewing head that is standard wherever bags are sewed. For binding the tops of multi-wall filled bags. Conveyor unit, *Style 21800 H*, and sewing head, *Style 80600 H*, adjust vertically to handle a range of bag sizes. Tape binding is clipped automatically at bag ends. Other length conveyors available.



NEED TO CHECK-WEIGH? This machine *(right)* is designed for closing bags on a platform scale; also available for use over floor scale. One person can fill, weigh, and close bags where production is limited. New high speed sewing heads in *Class 53600* available for closing either textile or paper bags. For platform scale, specify *Style 20200 N*; for floor scale, *Style 20200 P*.

YOUR OWN CONVEYOR SYSTEM? This heavy-duty, fixed-base column *Style 20100 H (left)* is designed to fit in with your custom-built conveyor system. Takes *Class 80600, 53600,* or *60000* sewing head. Sewing head is adjustable vertically and is driven independent of conveyor.

LIMITED PRODUCTION? ADDITIONAL PRODUCTION? Here is a practical all-around machine *(right)* that is ideal for the smaller plant with limited production requirements; also used extensively to supplement regular production in large mills. It is readily portable; has a "floating" bag carrier that returns to loading position automatically. Units available for use with either *Class 53600* or *Class 80600* sewing heads. Bag carrier and sewing head adjustable vertically to handle variations in bag sizes.

NO two jobs are exactly alike — that's why Union Special builds a wide variety of bag closing equipment. In the Union Special line you will find machines for closing all sizes and kinds of bags from small textile or paper bags of one pound, or less, up to the largest jute and multi-wall paper bags in use today.

Coupled with this broad line of equipment is Union Special's long background of experience and technical know-how that insures customers of getting THE RIGHT MACHINE FOR THE JOB!

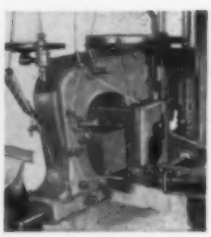
Union Special sewing heads for closing bags are also widely used by makers of specially designed filling, packaging, and automatic handling equipment. Union Special is always glad to cooperate with builders of special production equipment. Union Special representatives, located in all leading industrial centers, are qualified to give you expert recommendations.

Ask for Bulletin 200.

SEWING HEADS FOR EVERY PURPOSE!

CLASS 53600— For closing light and medium weight cotton, burlap, and up to 3-ply paper bags with plain sewed closure. Makes Type 401 Double Locked stitch, with two threads, but can be fitted to make Type 101 chain stitch with single thread.

CLASS 80600— Heavy duty, high production sewing heads for closing medium to heavy textile and multiwall paper bags with plain, folded over, or tape-bound closure. Choice of styles. Stitch Type 401 or Type 101.



STYLE 80600 H — For making tape-bound closure on multiwall paper bags. Filter cord guided under pressure foot. Equipped with automatic tape clipper. Choice of styles. Stitch Type 401 or Type 101.

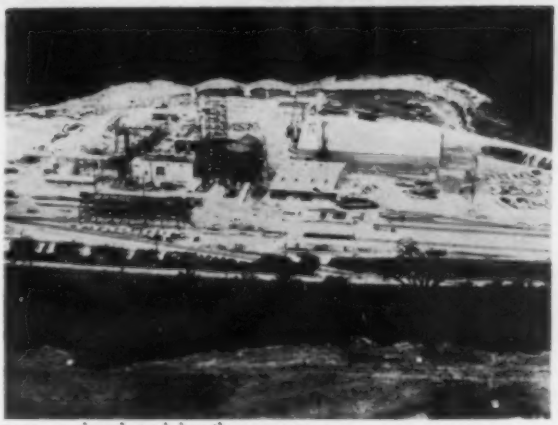
FINEST QUALITY
Worldwide Sales and Service

Union Special® MACHINE COMPANY

447 NORTH FRANKLIN STREET • CHICAGO 10, ILL., U.S.A.

BAG CLOSING MACHINES

Southwest Potash Plant To Produce Nitrate Of Potash



Construction of the new $7,000,000 plant of Southwest Potash Corporation in Vicksburg, Mississippi for the production of nitrate of potash and byproduct chlorine is progressing on schedule. Test and break-in operations will take place late this year as originally planned.

The Vicksburg plant marks Southwest's initial venture into chemical production. It will produce nitrate of potash using a new process developed by the company.

Stepan Names E. A. Knaggs

Edward A. Knaggs has been appointed director of research for the Industrial Chemicals Division of the Stepan Chemical Company, Northfield, Illinois. Mr. Knaggs had been associate technical director. He previously was chief chemist for Ninol Laboratories, Inc., joining Stepan in 1957 when Ninol was merged with Stepan Chemical.

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Second Annual HSAF Meeting

The Horticultural Spraymen's Association of Florida will hold its second annual convention on November 2-4 at the Galt Ocean Mile Hotel in Fort Lauderdale.

A score of speakers will talk on topics relating to such aspects of the industry as turf and plant diseases, weed control, chemicals, and the proper use of spray equipment. Larry Nipp, American Power Spraying Company, Fort Lauderdale, is general chairman of the convention.

•

Forms New Sales District

Monsanto Chemical Company's Agricultural Chemical Division will form a new sales district with headquarters at the company's offices in Chicago, effective November 1.

The Chicago district will include northern Michigan, North and South Dakota, Minnesota, Wisconsin, northern Illinois and most of Iowa, all currently part of the Agricultural division's St. Louis sales district.

J. Paul Ekberg, director of marketing for the division, said that the new district will permit expanded customer service and accommodate growing sales to farm markets in this seven-state north central area. At the same time, Mr. Ekberg named William O. Butler, now assistant manager of the St. Louis sales district, as the Chicago district manager.

Mr. Butler had served as sales representative for both Monsanto's Lion Oil Company Division and Inorganic Chemicals Division prior to being assigned to his present position when the company formed the Agricultural division last September.

•

Scott Names Wikle

Marion M. Wikle Jr. has been named a sales representative in Chicago for the Hollingsworth & Whitney Sales Division of Scott Paper Company, Philadelphia. Mr. Wikle had been a paperboard salesman for the Container Corp. of America in Pennsylvania, New York, and New Jersey prior to joining Scott.

•

Dow Names Office Heads

R. Sidney Braucher has been named agricultural chemicals sales manager in the Los Angeles office, and Silas K. Skinner has been appointed to a similar post in the Seattle office by the Dow Chemical Co., Midland, Mich.

At Los Angeles, Mr. Braucher succeeds R. B. Korsmeier, who recently was named manager of sales planning, development, and education for the agricutlural sales department at Dow's Midland headquarters.

•

Poison Control Centers

The number of poison-control centers affiliated with the National Clearinghouse for Poison Control Centers rose to a new high of 460 as of July 1, according to an announcement last month by Surgeon General Luther L. Terry of the Public Health Service.

The National Clearinghouse serves local poison control centers by providing them with information on new products, which it obtains through a voluntary arrangement with manufacturers. The centers maintain records of ingredients of trade-name products, plus antidotes, and make this information readily available to physicians.

•

Covers Cargo Handling

Thane E. Brown, chief engineer of the Portland, Oregon, Commission of Public Docks, co-authored the only technical report on bulk and cargo handling to be presented by the United States at the XXth International Navigation Congress in Baltimore last month. Representatives from more than forty nations attended.

Mr. Brown's report dealt with installations at ports for the loading and/or unloading of cargoes in bulk, excluding liquids, and for their reception and distribution, with the possibility of utilizing the same plant for different sorts of materials. His co-author, Maj. Gen. F. S. Besson Jr., chief of the Army's Transportation Department, discussed problems of vessel mooring and loading and discharging.

Mr. Brown covered Portland's methods of bulk cargo handling, with particular emphasis on the Portland Dock Commission's recently-completed bulk unloading tower.

Multiwall Bag Price Up

St. Regis Paper Co., New York, has increased by 4 per cent its price on multi-wall bags and pocket bags. Pocket bags are used to package items in 5-pound and 10-pound weights. St. Regis said the price increase reflects higher costs in raw material and labor.

West Virginia Pulp & Paper Co. said at the time that it hadn't decided whether to follow St. Regis' price increase, but added, "it's reasonable to assume that other producers will go along."

Earlier last month, Olin Mathieson Chemical Corp.'s packaging division announced a 6 per cent price increase on kraft shipping sack papers and asphalting kraft grades. International Paper Co. has advised that its prices for multiwall bag papers will be increased 50¢ per hundredweight and its base prices for multiwall bags will be increased 4%, effective Oct. 16.

Michigan Lime Conference

The Michigan Fertilizer and Lime Conference will be held on December 7 and 8 at Kellogg Center on the Michigan State University campus, East Lansing, Michigan.

•

Corn Management Folder

"More Profit from Corn in Minnesota" is the title of a leaflet prepared by the National Plant Food Institute in cooperation with the University of Minnesota and the Minnesota Bankers Association. Distribution of the leaflet is being made by the three organizations.

A good portion of the leaflet emphasizes the advantages farmers can "reap" from their soil resources with good management as opposed to average management.

•

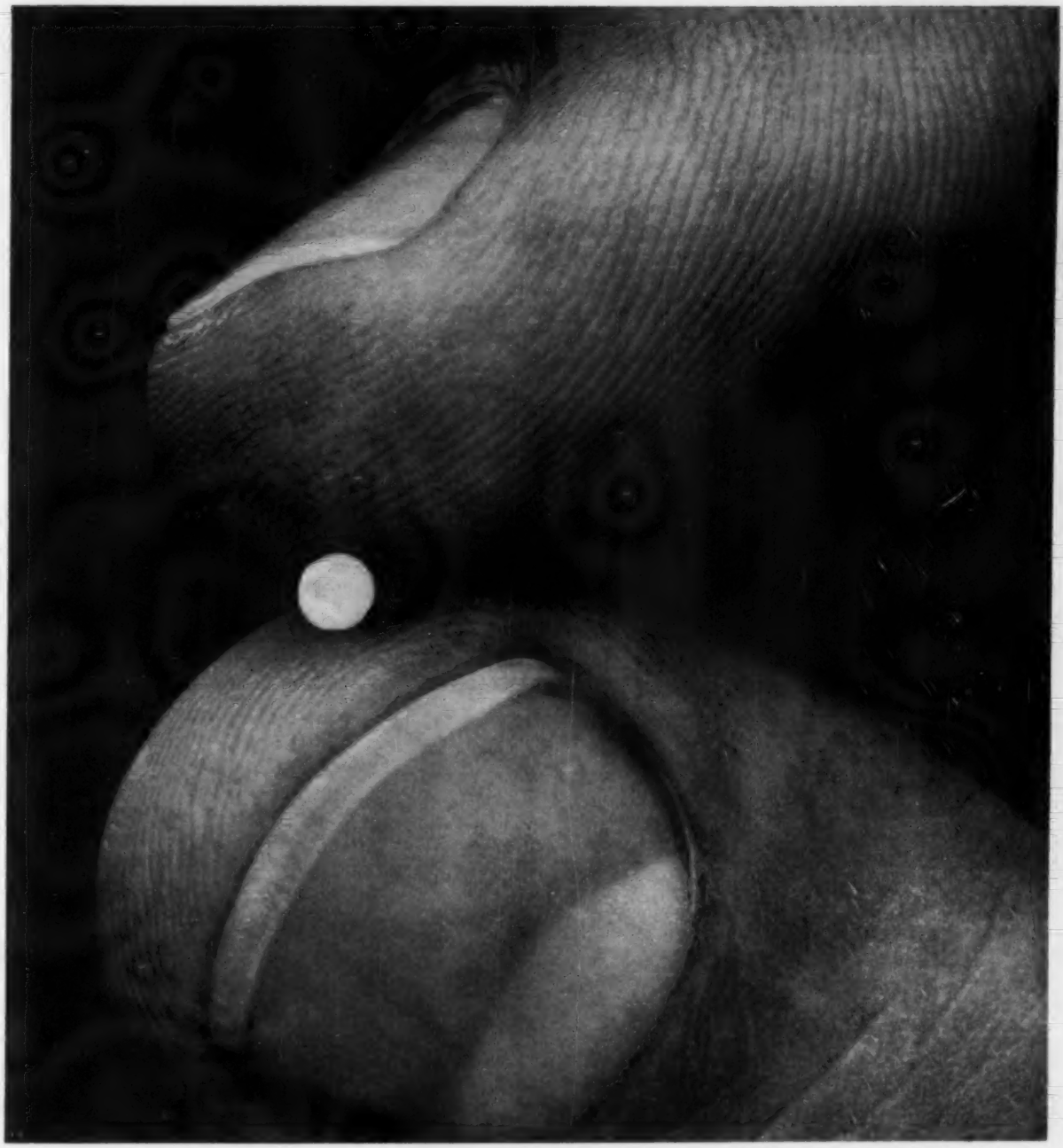
NH_3 Tonnage Up 10 Per Cent

The Agricultural Ammonia Institue, Memphis, Tennessee reports that the anhydrous ammonia industry finished the 1960-61 fertilizer year with a 10 per cent gain in sales. This would indicate total sales for the past year of about 790,000 tons, as compared with 717,000 tons for the 1959-60 year.

The AAI has just completed its annual survey within the industry in which 138 distributors from 24 states participated. Ninety of the distributors reported increased sales, and 40 reported decreases in tonnages. The reports include approximately one-fifth of all United States direct application ammonia. Following is the tonnage picture as shown by the survey:

1960	1961	Increase	Per cent
144,718	158,850	14,132	10

A substantial number of the distributors reporting increased tonnage advised the AAI that they had engaged in greater promotional activity, including field demonstrations, farmer meetings, and education, improved service, and devoted more "on farm" attention to customers, in addition to their normal sales and advertising functions.



From little urea prills big fertilizer profits grow

This remarkable urea prill, produced by Cobalez of Belgium, is probably the most economical and efficient source of solid nitrogen material available in the world today.

Belgian urea prills give you a guaranteed 46% nitrogen. The price per unit of nitrogen is comparable with competitive solid materials. What's more, the nitrogen is concentrated in a compact, uniform unit. Result? Excellent distribution. Easier handling. Substantial savings on transportation and storage.

Belgian urea prills are uncoated, yet so skillfully made they contain less moisture than coated material. They're free flowing; there's no dust problem. And you get maximum solubility (you can dissolve 880 pounds in 100 gallons of water at 68°F.).

Is it any wonder H. J. Baker goes 3,000 miles to get them?

You can buy Belgian urea prills in America right now. In quantity. With fast delivery assured. As the first step in seeing how much better they can do the job for you—and how much bigger they can make your profits grow—send for a free sample and complete information. Simply write to the H. J. Baker office nearest you.

H. J. Baker & Bro., Inc.

733 Third Avenue, New York 17, N. Y.

Branch Offices: 208 South LaSalle Street, Chicago, Illinois • 501 Jackson Street, Tampa, Florida • 361 East Paces Ferry Road, N.E., Atlanta, Georgia.

Est. 1830

To Build In Iowa

Monsanto Chemical Company will build an ammonia plant at Muscatine, Iowa, to supply nitrogen fertilizer materials in the Midwest. The new plant will add 200 tons per day to the ammonia production capacity of the company.

Construction of the facility will begin this month with completion scheduled for the fall of 1962. The plant will be built adjacent to a 15,000-ton anhydrous ammonia terminal which Monsanto now has under construction at a site four miles south of Muscatine on the Mississippi River.

•

Heads Garden Department

Richard T. Williams has been named manager of the new Lawn and Garden Products Department of the Dow Chemical Co., Midland, Mich. He had been assistant merchandising manager for Dow's agricultural chemicals sales department.

PCA Earnings Rise

Sales of Potash Co. of America, Denver, Colorado, in the year ended June 30 declined slightly from 1960 levels, but earnings, aided by a $526,531 tax credit, rose slightly. In fiscal 1961, the company reported earnings of $1,886,659, or $1.58 a share, up from $1,744,065, or $1.46 a share, in fiscal 1960.

John W. Hall, president, said the slump in sales was due to "abnormally cold and wet" spring planting weather and Government action which removed about 25 million acres of corn and sorghum land from cultivation. About 95 per cent of the company's potash output is used in mixed fertilizers or for direct application to the land.

Mr. Hall also said lower tonnage deliveries this year were partly due to heavy shipments made in June, 1960 in anticipation of a July price increase.

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Smith-Douglass Appoints

J. J. Pointer has been appointed assistant to the vice president of the Chemical Division and farm fertilizer sales manager for the southeast and southwest, by Smith-Douglass Company, Norfolk, Va.

Mr. Pointer now heads the Smith-Douglass fertilizer sales organization in the states of Virginia, North and South Carolina, Texas, Oklahoma, Louisiana and Kansas.

•

Jamaica Fertilizer Plant

An organic fertilizer plant with an annual production capacity of 60,000 tons is being established at Kingston, Jamaica, by a group of U. S. investors.

By agreement with the Kingston and St. Andrew Corporation (the municipal government of Kingston and its suburbs) the plant will receive all of the garbage of the island's capital city for processing. The finished product will be distributed mainly through the Jamaica Agricultural Society. The firm is incorporated in Jamaica under the title "Jamaica Organic Fertilizers Ltd."

Research Directors Named

Allied Chemical's General Chemical Division has appointed three research directors at its research laboratory in Morris Township, N. J. William C. Ruch has been named director of development research, Dr. Robert W. Mason is director of laboratory research, and Charles D. Boyer, Jr. is director of planning research. All three formerly were assistant directors of their respective departments.

•

John Deere Moves Offices

The executive and sales offices of John Deere Chemical Company were moved from Pryor to Tulsa, Oklahoma, last month. The new offices are located in the Ramada Building at 50th and Yale Streets, Tulsa 14. Departments affected by the move include administrative, sales, accounting, traffic, and advertising.

John Deere manufactures fertilizer and feed grade urea, ammonia and urea-ammonia solutions at the Pryor plant. The Tulsa plant produces a complete line of ammonium phosphate fertilizers.

•

TVA Merges Activities

The Tennessee Valley Authority has consolidated its agricultural and chemical activities at Muscle Shoals, Alabama. The consolidation was effected through the transfer of the Agricultural Relations Division to Muscle Shoals from Knoxville, Tennessee. Already located at Muscle Shoals was TVA's national Fertilizer Munitions Development Center consisting of laboratories, pilot plants, and full-scale fertilizer production facilities. Also, the Soils and Fertilizer Research Branch of Agricultural Relations has been at the center for several years.

•

Ammonium Nitrate Study

The Manufacturing Chemists' Association will finance a study by the Interior Department's Bureau of Mines into the fire hazards of ammonium nitrate, nitric acid-hydrocarbon, ammonium nitrate-urea, and combinations of these systems. The study is expected to cost $60,000.

•

Morrison Joins Hooker

William D. Morrison has joined Hooker Chemical Corporation, New York, as general manager of the company's newly-formed International Division. This fifth corporate Division is located at company headquarters, 666 Fifth Avenue, New York.

Mr. Morrison has been in the chemical industry since 1948. For the past five years he was associated with FMC Corporation as manager of the Central Developing Department, general manager of International Chemical Operations for FMC International, and vice president and director of FMC International Limited. Previously, he was assistant manager of the Commercial Chemical Development Department of Celanese Corporation of America.

•

Southern Weed Conference

The 15th annual meeting of the Southern Weed Conference will be held in Chattanooga, Tennessee, January 17 to 19, at the Hotel Patten. A tour of brush control work by the Tennessee Valley Authority and Bowater Southern Corp. will be a feature of the meeting.

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Armour Shifts Three

Armour Agricultural Chemical Co., Atlanta, Ga., has made three personnel changes in its Fertilizer Division. At Columbus, Ga., Oscar N. Carmichael has been named assistant division manager, while Robert A. Cannon was appointed division credit manager.

In a change at Cincinnati, Ohio, Harold S. Rose was named assistant division manager. Mr. Rose, who joined Armour in 1957, had been a salesman with the Cincinnati division. Mr. Carmichael joined Armour as a salesman in 1951, and had been with the New Orleans division. Mr. Cannon joined Armour in 1959.

Meeting Dates Changed

The Mexican Association of Insecticides and Fertilizers Manufacturers has changed the dates for its annual convention in order not to interfere with Thanksgiving Day. Originally scheduled to be held Nov. 21 to 24, the meeting has been advanced a week and will be held November 14 through 17. The headquarters for the meeting will be at Hotel La Perla in La Paz, Lower California.

•

Tank Cars For Armour

General American Transportation Corp., Chicago, has received an order for 120 aluminum tank cars from Armour and Company, one of the largest single orders for this type of car ever placed.

A joint announcement by Armour and General American stated that the ten-thousand-gallon aluminum cars, insulated with four inches of fiberglass, will be used to carry liquid nitrogen fertilizer manufactured by Armour Agricultural Chemical Company. The fiberglass insulation will keep the liquid fertilizer from vaporizing and building up gas pressure inside the tank.

Harry Matthews, Armour's vice-president in charge of traffic, said that the new fleet will be used to carry fertilizer solutions from Armour Agricultural Chemical Company's plant now under construction near Cherokee, Alabama.

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To Build In So. Africa

A fertilizer plant is to be erected at Sasolurg, South Africa, by Windmill Fertilizer Co. The facility will use both locally produced and imported phosphates.

POST EDITORIAL

(*From Page* 34)

L. Stoddard, a prominent conservationist of Thomasville, Georgia, which, even three years ago, related the sensible approach taken by most practical conservation authorities.

"Finally," NAC continues, in answer to the observation that "the pesticide program is the greatest threat that animal life in North America has ever faced, we submit a statement made by the Department of Fish and Game Management of the State of California. When comparing pesticides with other factors influencing wildlife environment, the Department holds this view: 'Considered in its broadest scope, at the present time, pesticides seem to be only a minor influence in nature compared with other factors in land and water development and use. Urbanization, industrial pollution, drainage of marshlands, bringing land into cultivation—to name a few such factors—all constitute greater hazard to wildlife survival than chemical use'."★★

PHOSPHATES

(*From Page* 26)

great variance in growing time of crops, this offers a means of increasing the efficiency of the fertilizer for a specific crop. Crops such as radishes, which grow to maturity in a very short time can utilize the pulverulent form effectively, while very long term crops such as trees can utilize large granules more effectively. Nitrification of the compounds is the dominant factor in determining the rate of availability. This in turn is controlled by the total surface of the granules. Fixation and leaching cannot then immediately begin on the whole mass as is common with soluble fertilizers. Depending on granule size, moisture, temperature and other factors, nitrification of the insoluble materials may proceed at a rate high enough to supply the plant with sufficient nutrients without building up concentrations susceptible to leaching or fixation. Since nitrification takes place most readily at temperatures and moisture levels favoring greatest plant growth, this should also lead to more efficient utilization of the fertilizer. Single heavy applications of large granules can thus be made under crops being grown for very long periods with some assurance that the nutrient supply will cor-

respond with favorable growth periods and be effectively utilized.

All crops needing supplemental nitrogen, phosphorus, and minor elements, and especially those grown in areas where leaching and fixation of these elements is most pronounced, are logical candidates for use of and further research with the metal ammonium phosphates. Any crop which could benefit from foliar application, or is susceptible to salt injury, and where cost of labor for repeated fertilizer application is high, would also be a good candidate for this new fertilizer.★★

WASHINGTON REPORT

(*From Page* 65)

take an interest, too. One of the subjects which wildlife people want to get into is the run-off of any chemicals into streams or lakes and their effect upon the purity of the nation's water resources.

Early Adopters

A big factor in the speed of future progress is just how fast farmers adopt new practices. One survey discloses that the average adoption period for 2,4-D was just over two years. This covers the stages of becoming aware of the practice, getting information about it, applying it, testing it, and finally adopting it.

The real key to rapid adoption of new practices or new products, say the surveyers, is the skill used in presenting the right information to farmers at the right time to get maximum results. What finally sells farmers on adoption, however, are favorable results when they try the new practice or product on their own farms. The art is to bring farmers to this point with the least possible time lapse.

All research in the field stresses the importance of agriculture agency publications and bulletins, farm publications, radio and TV in reaching the innovators and early adopters of new products and practices. These leaders can obsorb impersonal information and put it to use; then the information "trickles-down" to the mass of later adopters. These seem to prefer to base their action upon information obtained from successful neighbors and recognized farm leaders of their communities.

Farm Commodities

Farm leaders are beginning to disclose that one of the deep-down reasons for opposition to Agriculture Secretary Orville Freeman's "write-your-own-ticket" commodity-by-commodity approach to farm problems is the fact that farm commodities are not isolated products such as automobile and airplanes.

Farm commodities are interrelated. What happens to one crop or one livestock commodity can, and often does, affect others. Dr. A. William Jasper, of the American Farm Bureau Federation, cites the experiences of farmers going into poultry because of controls which limited their income and oppor-

tunities in traditional crops. By taking one action, one commodity group could cause others severe and unexpected problems unless there was some overall coordination of programs.

Rightly or wrongly, farm leaders felt that the Secretary's approach would divide agriculture into separated commodities and only the Secretary would be in a position to provide needed over-all direction of the farm economy. Farmers themselves, working through farm organizations, should be able to contribute to their economic future, say these farm leaders.

Chemical Drift

In the wake of some complaints about chemical drift, both the agricultural chemicals industry and aerial applicators are starting to talk about closer liaison between the two groups.

The real problem comes not from the crops being treated, but from different crops in adjacent fields, with aerial applicators saying that some recommendations are made without due consideration for neighboring crops.

While the grower, generally, has the prime responsibility for the use of chemicals, chemical companies and applicators share some responsibility, too. The reasonable conclusion both groups are reaching is that aerial applicators and chemical firms are interdependent and are often linked together in doing a job for the farmer.

The objective of both the industry and the applicators is to help the farmer move agriculture ahead, and keep it, as Agriculture Secretary Freeman is fond of saying, "America's number one success story."

NAC Program

Here are some features of the National Agricultural Chemicals Association's annual meeting you will not want to miss. No matter how attractive outdoor activities may be at The Homestead, we understand that Willie Mae Rogers, Director of the Good Housekeeping Institute; D. A. Spencer, Biologist of the Wildlife Research Center in Denver; and Health, Education and Welfare Secretary Abraham Ribicoff will have something to say which you won't want to miss.

The presence of Secretary Ribicoff by itself shows HEW's recognition of the importance of the Industry to public health and to agriculture. Aside from the Secretary's address on HEW's approach to the use of pesticides, you can look for some unexpected and authoritative views from Miss Rogers on what women *really* think about chemicals in foods, and from Dr. Spencer on the proper use of chemicals to aid wildlife management.★★

ACS MEETING

From Page 15

generally verified the effectiveness of these fatty amine based conditioning agents when the desired

conditions for application are obtained.

Rates of commercial usage have been found higher than required for laboratory evaluation, and have been in the range of one pound of Armoflo per ton of fertilizer. Mr. Chandler indicated that the amines used in fertilizer formulation are also corrosion inhibitors, which plate out on iron and steel to coat the metal with a protective surface.

According to Mr. Chandler, in-plant usage has determined that dust control may be obtained at the same time as anti-caking without increased Armoflo use. Maximum spreading is fostered by spraying the amines onto particle surfaces.

Compost Fertilizers

IN a review of composts and their use for soil improvement, M. S. Anderson and R. S. Dyal, USDA, Beltsville, pointed out that the market for composts is not a fixed one. Each producer must find a buyer, a not easily solved problem, since garden supply stores do not often carry such goods. Production and transportation costs seem to rule out such products for use on general farm crops, except where produced locally.

The future of composts is difficult to predict, observed Mr. Anderson. Waste products require disposal, and composters are making a bid for a part of the business. A few garbage compost plants have continued in operation, but the tonnage marketed would seem to be small.

The chemical composition of a compost from a fertilizer standpoint is variable, and is low compared to mixed chemical fertilizers. The nitrogen is low compared to seed meals and certain other natural organics. The nitrogen content of a compost usually runs from 1 to 2.5 per cent. The total plant food content seldom exceeds 5 per cent.

Chemical fertilizers should usually be used in conjunction with composts, not admixed with them. Composts are likely to be most effective when well mixed with soil, while mixed fertilizers may be most effective when banded.★★

CARBAMATES

From Page 17

dioxyphenyl benzenesulfonate (III) are good synergists of carbamates against normal and DDT-resistant and parathion-resistant house flies (13). Octachlorodipropyl ether (IV) synergises carbamates against normal and carbamate-resistant house flies (14).

In several cases, "analog synergism" (which has sometimes been called "potentiation") has been found in house flies, milkweed bugs and cockroaches, i.e. two carbamates together were more potent than expected. The effect is usually relatively small and is probably of no practical importance. At best, mortalities of five times those expected were observed (15).

Hazard

Most of the insecticidal carbamates are moderately toxic to mammals. Sevin is relatively safe, with acute oral LD_{50}'s of 510 mg./kg. to the rat and 710 to the rabbit (16); for dimetan oral LD_{50}'s of 90 (17) and 30-40 (18) have been reported for the mouse, and 150 for the rat (19); for Pyrolan oral LD_{50}'s are 62 for the mouse and 90 for the rat (17). However, Isolan may be more hazardous, since its oral toxicity to mice and rats is about 13 mg./kg. (19).

Commercial Development

The insecticide industry has known the dithiocarbamate structure for many years as the backbone of synthetic fungicide development. As previously indicated, thiocarbamates are unrelated to true carbamates in physiological action. However, it is interesting to note that water soluble dithio-

carbamates are finding a place in control of invertebrate animals. Vapam, for example, is being used against nematodes, symphylids, garden centipedes, weeds and fungi. Insoluble dithiocarbamates are mildly toxic to insects and mites (20, 21).

True carbamates first reached large volume use as herbicides. Isopropyl *N*-phenylcarbamate (IPC) was selected as a most promising structure in 1945 (22). Addition of chlorine to the molecule produced Chloro IPC, currently used herbicide. Development of carbamates as insecticides is more recent. To date, only one compound has proven sufficiently successful to enter large scale use. This is the compound Sevin. As code number 7744 it was proven insecticidally promising in 1953.

(To Be Continued)

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FERTILIZER VIEWS

From Page 63

pay the cost of maintaining it as insurance against a food shortage. We stockpile minerals, armaments and other materials to serve in the event of war. It is equally prudent to cache foodstuffs. Surplus grain might be used to feed livestock and the meat products from such could be preserved by canning, freezing, dessication and other acceptable means.

The agriculture of the Soviets and their satellites remains, for the most part, a peasant type of farming which still depends upon man and animal muscle for most of its power. They do not depend upon machines and chemicals to the degree our farmers do. An attack on their industrial plant would not paralyze their agriculture. We are vulnerable in our strength, it seems.

Let us not be too hasty about reducing beyond a reasonable level our American food reserves. And let us scorn those who counsel that agricultural research should be suspended for several years as a means of reducing or eliminating farm surpluses. Efficiency in agricultural production is one of America's precious assets and might even be a deterrent to war.★★

MIDDLE MANAGEMENT

From Page 20

covered. After discovery, facts must be placed in the proper relationship, and weighed in importance as to whether or not any fact, in itself, is decisive to the problem. Sometimes one factor overweighs all other considerations, such as major moral issue of fraud, stealing, etc.

A. Cost—what will the problem cost the company in either outright money or goodwill if not solved? How costly is failure?
B. Return to the company in goodwill, money or customer satisfaction.
C. Extent of risk run by not solving problem, or coming

up with the wrong solution.

D. Hazard to the company involved.

2. Any underlying causes of this problem—just a symptom or actual problem? Temporary or permanent?
3. Isolation of actual problem is complicated by other factors—often times real problems are obscure and middle management attempts to make a bigger problem than exists. If a series of problems do exist, separate them. Usually, problems are not as overpowering when sorted and classified. If too obscure, use a method of establishing perimeters around the problem so that at least its full dimension can be discovered..
4. Personal feelings on the problem—this is an important factor, however, experience is not the only answer to a problem. Actually, experience, as well as a faulty memory, could block a good decision. Experience is an unlearning process as well as a learning one.
5. Timing – the question of whether it is better to wait or better to act is always a critical one. Problems do change, but time is not a solution in itself; timing can also be a defeat.
6. Motivations of those creating the problem – problems are mostly created by people and the motives of the creation of the problem should be examined. There are many factors in a problem that can be controlled by the solver as well as by the creator; and, also many factors are controlled strictly by chance. Are they all working for solution of this problem?
7. Description of problem by other people may be helpful; however, it is always necessary to question the validity of facts given by others. Most remote problem solving is done by good questioning.

The odds of solution become better when this analysis is complete. Even a pencil and paper are handy at this time. Words or diagrams can be used and aid in the definition of the problem.

II. Proposal

This is the section of problem analysis that is often omitted. This is known as the "stare into space," "dreaming," or "opium pipe" session wherein the problem solver lets his mind rove all over the problem after adequate fact finding and weighing. The mind should have no restrictions here (Cost elements, personnel limitations, lack of capital, or any other factor that might limit the decision are to be ignored). This part of problem solving is often dismissed as "dreaming," but the real question is whether or not the solver can turn this problem into an advantage for the company.

Here the chance for creativity is the greatest. Creativity can only come by adequate mental exposure; it has to be removed from the time pressure of decision.

Here is the opportunity, during proposal period, to examine all the alternatives that most problems offer.

1. Substitute solution—a different product or raw material, a change of personnel, etc.
2. Additives such as "oil on a nut that is hard to loosen," or a "temporary scaffold."
3. A neutralizing factor – neutralizing doesn't solve the problem but makes the problem easier to live with, e.g., no longer sell the customer if you can't please him.
4. Remake the problem – attempt to look at problem differently from another point of view and decide whether or not you can afford some experimentation to arrive at a solution.

5. Examine logic—deduction or induction are often used but they may not necessarily be true when we have the human interference.
6. Analogy – whether or not there is a similarity between this problem and other problems that have existed in the solver's experience.

III. Survey

Turning Problem Analysis and Proposal into reality is accomplished with Survey. Cost restrictions, personnel limitations, and the lack of capital to be used come into importance. Most organizations have practices and ways of doing things which limit solutions. Consideration of these occurs during Survey. Which solution is the best in line with reality?

IV. Solution & Execution

Decide upon it—do it! Firmly, concisely and definitely, but do it! So many decisions are excellent, but never executed. Unfortunately, no solution can be completely satisfactory, and a solution may create another problem. Each solution the solver comes to should be an aid in the next problem. Also, it should be kept in mind that all solutions are risks.

Summary

What can be done to improve middle management's ability in problem solving?

1. Top management must review decisions made by this group to stimulate interest in good problem solving. The mere fact that decisions are reviewed tends to make middle management try harder for the best solution. Actually, the recognition that a problem exists is the first step in training.
2. Management schools are a help providing a "case method" is used where the emphasis is placed on problem solving.
3. Periodic individual or small company conferences by top management.
4. Correspondence courses could be used if manager is in remote area.
5. Middle management may assist by recognizing corporate problems, whether related to them or not, practicing on problems and comparing their decision with the one made—not in a spirit of "second-guessing" but analyzing the "whys and wherefores" as if they had the problem. Unfortunately, corporate problems can only be solved by top management.
6. Suggested procedure for problem solving is as follows:

I. Problem Analysis
   - A. Value of Problem
   - B. Underlying Causes
   - C. Isolation
   - D. Personal Feeling
   - E. Timing
   - F. Motivations
   - G. Ability to Question

II. Proposal
   - A. Creativity
   - B. Alternatives

III. Survey
   - A. Reality

IV. Solution & Execution
   - A. Reduce risk by using good techniques of problem solving★★

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RESIDUE ANALYSIS

From Page 24

chromatographic analysis serves to remove the doubt of identity by showing peaks characteristics for each pesticide.

Low blanks may be achieved by this technique, in part from the small quantity of reagents involved in the dehalogenation procedure and in part from the partial purification of the pesticide by the first gas chromatographic step.

Microcoulometric Chromatography

Gas chromatography in combination with a microcoulometric detection system has been used for the analysis of chlorinated pesticides, report J. Burke and Loren Johnson, Food and Drug Administration. Using a chromatographic column of 20% silicone grease on chromosorb, 62 of 75 pesticides tried have been found to chromatograph. The method is rapid and sensitive, they say. It offers both qualitative and quantitative measurement of the pesticide.

In many cases, crop extracts need little or no cleanup. Cleanup may be necessary for some crops and waxy materials and for certain pesticides or pesticide combinations,—these problems are under investigation.

Effects on Wildlife

SEVERAL reports were presented before ACS members by researchers with the U. S. Fish and Wildlife Service, Patuxent Wildlife Research Center, Laurel, Md.

These reports concern studies being conducted under PL 85-582 to determine the effects of pest control operations on wildlife.

Toxicological effects of Kepone on quail and pheasants were reviewed in a paper by C. M. Menzie, J. B. DeWitt and Lewis M. Locke, who noted that Kepone (suggested as a replacement for heptachlor in the fire ant control program) is less toxic than heptachlor or heptachlor epoxide in laboratory tests, but has marked inhibitory effects upon the reproduction of quail and pheasants.

Birds will survive for extended periods when fed diets containing 100 ppm (about 3 ounces per ton of feed), but die when fed diets containing higher concentrations or when the daily intake of Kepone exceeds 25 mg/kg. Feeding of diets containing sub-lethal amounts of the insecticide resulted in abnormal coloration of feathers of males of both species. Plumage of male quail which had been fed Kepone during the growth period resembled that of females, and no viable chicks were produced by birds fed 50 ppm prior to and during the breeding season. Quail fed at levels of 1, 5, 10 or 25 ppm produced some chicks (about 60 per cent of number from birds on insecticide-free diets), but nearly 20 per cent of these chicks were crippled or defective.

Feeding of Kepone (25 ppm) to pheasants resulted in loss of characteristic markings of males, and sharp reductions in reproductive success. Birds fed at this level prior to and during the breeding season produced only 0.7 chick per hen, whereas birds fed insecticide-free diets produced 13.7 chicks per hen. Autopsy and histopathological examination of these birds showed damage to, or abnormalities in, the livers and testes.

In another series of tests reviewed by Vyto A. Adomaitis, Mr. Menzie and Mr. DeWitt, one-day old quail and pheasant chicks were fed diets containing Guthion, malathion, Dylox or Delnav.

Although food consumption was normal, they noted quail growth was depressed 10 to 15% by the organophosphate-containing diets during the first few weeks. However, body weight returned to normal by the end of the 10th week. Dylox had the greatest toxic effect on quail.

Pheasant growth was depressed by malathion, but the other ma-

terials appeared to have no effect on growth of the species. The overall mortality rate was the highest for malathion.

For both quail and pheasants, mortality was greater for the test groups than for controls. The reproduction of both was adversely affected by all of the test materials.★★

FERTILIZER BUYING

From Page 40

There is still another aspect of fertilizer use for profits. This involves the substitution of one resource for another. Many farmers are more limited in capital funds than in cropland and pasture land. Therefore, they substitute acres for fertilizer. The previous example of corn response to nitrogen indicated that the first 30 pounds of nitrogen gave a return of $33.60 above the cost of nitrogen. In cases where land is not a limiting factor, and the added costs of using land are relatively small, a farmer may apply 30 pounds of nitrogen to each of two acres instead of 60 pounds on one acre. As a result, he would get $36 return above the cost of nitrogen instead of $33.60.

Returns for Fertilizer Use

It is important that producers know what they are getting back for the fertilizer used. It is a challenge to the dealer to assist farmers in calculating returns and in discussing how they might increase profits from changes in fertilizer use and other practices.★★

PEST ROUNDUP

From Page 53

Marion, and Morris. The fly continues to be a problem in the majority of states in which it occurs. The screw-worm has been worse in Texas this season than in recent years, and has increased in parts of central and south central Oklahoma. The insect has been reported from the southwestern part of Arkansas, where adults have been extremely heavy on cattle during the summer.★★

AQUATIC WEEDS

From Page 32

The spraying was done through a 20-foot boom at the stern of the association's barge. There are 14 quarter-inch nozzles on the boom and they release the sodium arsenite close to the water's surface. By August of the same year, it was evident that the spraying could restore the lake to the cleanliness, beauty, and usefulness that had made it famous in earlier times. One trouble spot, Burtis Bay, for instance, was virtually choked with weeds only a few years ago. Today, there are no weed beds. The same is true in most of the weed-infested areas of Chautauqua Lake, according to association

officials who term the results of the 1959 spraying as "amazing." The chairman of the weed-control committee said, "I have heard nothing but the most enthusiastic reports from all sections of the lake. The weed kill in 1959 was successful beyond our wildest hopes. Of course, there are always floating weeds, but even those were down to a minimum."

The shipment of sodium arsenite delivered to the lake for the 1960 weed spraying program consisted of 109 steel drums, each containing 55 gallons. The material was supplied by the Niagara Chemical Division of FMC. Middleport, N. Y. The cost to the Chautauqua Lake Association was slightly over $4,000.

The spray program for 1960 began on May 31 and was scheduled so as not to interfere with use of the lake during the Memorial Day weekend and to come well in advance of the regular vacation season. It was completed June 8. Dropped from the 1960 program was Burtis Bay, which had been treated successfully for four consecutive years. Results there are being watched closely by weed committee members.

The 1960 spray schedule provided for treatment of a total of 700 acres. The same acres also were treated in 1959. Even though the weed kill in some spots was not as good as in 1959, due to unfavorable weather conditions, the 1960 program is considered to have been a success. Best results were reported in the extreme lower end of the lake, where the beds had been most annoying.

As with all such ventures, however, problems can be expected to arise. One of the problems facing the Chautauqua Lake Association was mentioned by G. E. Burdick, senior aquatic biologist for the New York State Conservation Department, in a talk at the 15th Northeastern Weed Control Conference in New York, January 4 to 6, 1961. He said that it begins to appear that low level arsenic treatments may increase weed growth

greatly outside the treatment zone, and even inside after lethal concentrations are dissipated. "Complaints are now being received," he reported, "that in the untreated areas (of Chautauqua Lake) the density of the weeds is greater than it had ever been previously."

Association officials are careful to stress, however, that all they go after is nuisance weeds that render portions of the lake useless for boating, swimming, and fishing. The association is continuing its weed control program and expects each year to see less and less weed growth in the lake. Officials say they are still experimenting and, "since weed spraying itself is a relatively new concept, time is needed to improve operations."★★

LISTENING POST

From Page 54

10 parts per million. Higher concentrations, 20, 40, 80, and 100 ppm, resulted in complete control.

Reduction of Frost Injury

Bert M. Zuckerman, (5), of the University of Massachusetts College of Agriculture Experiment Station, writes that every fall a part of the Massachusetts cranberry crop is frozen before harvest. Losses have varied from an estimated 60% in Massachusetts in 1917 to relatively small percentages in other years. Certain bogs are particularly susceptible to frost damage, however, and incur commercially significant losses in many years. Observations indicating that fungicide-treated bogs might suffer less damage led to further study of the relation of fungicidal treatments to frost injury of cranberries. Maneb, zineb, bordeaux mixture, and ferbam were the fungicides used. The significant reduction in percentage of frozen berries in treated as compared with untreated plots showed that the reduction in amount of frost damage was related in some way to the fungicide treatments. The freezing point of the berry apparently was not affected by the treatments. Zuckerman concluded that the effect may have been due to environmental changes brought about by the treatments, possibly the inducing of a heavier leaf growth that would conserve heat around the berries.★★

Literature Cited

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(3) Maier, Charles R. 1961. In-the-furrow application of soil fungicides for control of cotton seedling diseases. Plant Disease Reporter 45: 276-280. April.

(4) Motsinger, R. E. 1961. Evaluation of an experimental nematicide, *O,O*-diethyl *O*-2-pyrazinyl phosphorothioate. Plant Disease Reporter 45: 335-340. May.

(5) Zuckerman, Bert M. 1961. Reduction of frost injury in cranberries by fungicide treatments. Plant Disease Reporter 45: 253-254. April

Closing Materials Guide

A wallet-size reference table for estimating the amount of materials required to close sewn open mouth multiwall bags now is available from St. Regis Paper Co., New York. Called the Closing Materials Calculator, it has been devised by the company's Bag Division as a ready guide for production, materials handling, purchasing, research, and engineering planning personnel.

The calculator lists, for 1,000-bag lots, the amount of closing materials which would be required for bags ranging in face width size from 10 inches to over 24 inches.

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Animal Health Research

Chemagro Corp., Kansas City, Mo., has formed an animal health research section as part of its research and development department. Dr. Harold R. Dettelbach has been named supervisor of the section. He had been director of research for Jensen-Salsbery Laboratories of Kansas City.

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CLASSIFIED ADVERTISING

Address all classified replies to Box Number, c/o Agricultural Chemicals, P. O. Box 31, Caldwell, N. J.
Rates for "Help Wanted" advertisements are 20¢ per word; minimum charge $3.00. Rate for individuals seeking employment is 5¢ per word, $1.00 minimum.
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FACTORY REPRESENTATIVE: Well known Midwest Manufacturer of specialized fertilizer solution equipment is seeking qualified men for sales expansion. College education helpful, sales experience in fertilizers, farm equipment and the ability to command customer respect most important. This sales position offers unlimited potential in earnings and personal growth for a hard working aggressive man. Liberal commissions with an exclusive territory. In reply state education, complete information on sales experience and past employment, age, family and references. Please address resume to Tryco Manufacturing Co., Inc., P. O. Box 1277, Decatur, Illinois.

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BACK COPIES

of Proceedings of the Fertilizer Industry Round Table, for the years 1958, '59, and '60, are available at reduced prices for quantity orders. Contact Dr. H. L. Marshall, 1604 Walterswood Rd., Baltimore 12, Md.

To Exhibit Pulverizer

The Hurricane Pulverizer-Classifier, a newly developed air attrition mill will be demonstrated by The Bauer Bros. Co., Springfield, Ohio, in booths #1430-31 at the 28th annual Exposition of Chemical Industries to be held in New York Coliseum, Nov. 27 to Dec. 1.

The Bauer Hurricane will reduce and classify dry, friable material to any desired fineness with exceptional uniformity of particle size in the range from one to 150 microns. The machine can be used for processing chemicals, insecticides, talc, food products, resins, dyes, ceramics, drugs, plastics, fillers, pigments, asbestos or other materials requiring super fine pulverization and classification.

Bauer will also display products for pressing, classifying, grinding, mixing, separating, and cleaning, for both wet and dry operations in the process industries.

Situations Wanted:

AGRONOMIST—M.S., additional graduate work in Plant Physiology (weed control). Age 34, married. Extensive experience includes: Formulation of pesticides, field and greenhouse testing of herbicides, other agricultural chemicals and fertilizers and turf management. Desires position in technical service or field development. Willing to relocate for challenging opportunity. Address Box 329, c/o **Agricultural Chemicals.**

ENTOMOLOGIST—B.S. 10 year varied experience. Wishes position with challenge and future, especially technical service or laboratory. Please reply to Box 330, c/o **Agricultural Chemicals.**

Subsidiary In Brazil

A subsidiary corporation in Brazil has been formed by Dorr-Oliver, Inc., Stamford, Conn. Known officially as Sociedade Tecnica, Industrial Commercial Dorr-Oliver (Brasil) Ltda., the new company is located in Sao Paulo.

The firm will conduct sales, engineering, and procurement activities relating to installations of Dorr-Oliver equipment and processes in Brazil. Managing director of the firm is Paul Mourier-Peterson, who previously was responsible for operations in Mexico and Central America for Dorr-Oliver.

•

Chipman Lists Changes

A number of changes in the organization of Chipman Chemicals Limited, Hamilton, Ontario, have been announced.

J. G. Hastings, formerly general sales manager, will hold the newly-created post of marketing manager. L. M. Godfrey has been appointed eastern region manager and will be responsible for agricultural sales east of the Manitoba-Ontario border as well as for production and administration of Chipman Chemicals plants in eastern Canada. Mr. Godfrey was formerly development and technical service manager of the Chipman company.

T. C. L. Jacob, formerly Chipman's chief chemist, becomes technical manager, and former Ontario sales manager, J. R. Murphy has been appointed commercial products manager.

•

Antara Names Underwood

E. S. Underwood has been named manager for surfactants at Antara Chemicals, a division of General Aniline & Film Corp., New York. He had been manager of heavy chemicals and is replaced in that post by W. C. Calvert Jr. Mr. Underwood joined Antara in 1953.

IMC Scholarships To 14

Fourteen county agricultural agents from five states have been awarded scholarships to attend extension courses in communications next year. Names of the winners were announced at the annual meeting of the National Association of County Agricultural Agents in New York, September 10-14.

The new scholarship program, sponsored by International Minerals & Chemical Corporation, is designed to further the county agents' abilities in using communications to bring new ideas and techniques to farmers. State winners are:

Arkansas: John I. Coley, Robert Schroeder and Lloyd Westbrook.

Colorado: Edwin H. Amend, Raymond E. Peterson, and Bruce Whitmore.

Florida: Milford Jorgenseon, James N. Luttrell, and John Russell.

Illinois: Harold L. Brinkmeier and Stanley S. Sims.

Maryland: James A. McHenry, Joseph M. Steger, and Reginald A. Traband.

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License To Reasor-Hill

Diamond Alkali Co., Cleveland, has granted to Reasor-Hill Corp. a non-exclusive royalty-bearing sub-license that provides rights for the manufacture and sale of Weed Rhap, Reasor-Hill's granular herbicide.

The move followed conclusion of Diamond's civil action against Reasor-Hill for patent infringement. The dispute recently was settled amicably, and a consent judgement was filed by counsel for both parties.

•

OK Ethion on Field Corn

Field corn has been added to the list of crops on which ethion pesticide can be applied to curb mites. The U. S. Department of Agriculture has accepted a label claim by Niagara Chemical Division of FMC Corporation for use of ethion on corn as a control for two-spotted spider mite and Pacific mite.

"Farming's New Face" Highlights Changes In Agriculture

The story of the continuing change in American agriculture is presented by *Successful Farming* magazine in its new film, "Farming's New Face." The film carries the theme that "Today's business farmer is a different person . . . managing a drastically different business. He is part of an industry in transition, with one foot in yesterday . . . the other in today . . . getting ready to step into tomorrow. He is, and will continue to be, a good prospect for the products of American industry. But, marketing methods of the '60's must change along with changes in the farmer and his business, if we are to attain maximum effectiveness in converting today's better farm prospects to customers."

In one section of the film, the significance of the changes to marketing and communications is reviewed by Drs. George Beal and Joe Bohlen, Iowa State University. Changing status symbols are an integral part of the changing farm picture, according to Bohlen and Beal. For instance, it is no longer so important that the farmer own land and how much he owns, but how much in terms of land resources does he command? Field machinery and materials handling equipment, they point out are becoming the new status symbols.

Some of the points emphasized in the Successful Farming film is that the trend is toward: Fewer farms . . . but larger farms, producing more of the products of industry. There will be fewer dealers of most product lines in the 60's . . . but they will be larger, better equipped, smarter. The successful farmer of the 60's will demand more service, . . . insist upon reputable, quality brands, . . . buy in larger quantities. He will expect expertness from those who serve him. And he will be willing to pay for it.

The farmer is and will continue to be a good customer, but appeals to him must change along with the changes in him and his business.

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INDEX TO ADVERTISERS

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TALE ENDS

ANOTHER use for fertilizers has been found in California where the U. S. Forest Service is spraying brush and grass with chemical fertilizers to control forest fires. The fertilizers are treated with sticking agents so that they adhere to the plants to form effective fire walls. After Shell Chemical Co. had sprayed a dry brush area with fertilizer in one test, the brush couldn't be lighted with a kerosene torch. Borate solutions commonly are used to retard destructive brush and forest fires, but these chemicals are harmful to plants. The fertilizers are expected to cling to the plants only until rains come, and then will wash into the ground like any other fertilizer.

One of our correspondents is looking for a map of the United States that will show the principal crops grown in each state. Although there surely must be such maps somewhere, we can't find any in our files. Perhaps one of our readers can put us on the trail of a map that would help us fill this request.

AC

A federal judge last month said that the Cuban government set up a dummy company to dodge a U. S. embargo on goods going to Red Cuba, and he urged further investigation into the whole operation. The bogus company attempted to purchase $500,000 worth of agricultural pesticides for shipment to Cuba. (See *Agricultural Chemicals*, Feb., 1961, pg. 106). Paul Marks and Robert S. Leeds of Marks and Leeds Co., Inc., Coral Gables, Fla., reportedly took the Fifth Amendment when questioned by customs officials about their involvement. Assistant U. S. Attorney Robert Newman said that Marks & Leeds purchased the insecticide from Woodbury Chemical Co. in their capacity as purchasing agents for the dummy company, that supposedly had headquarters in Mexico City. The insecticide was one of two Cuba-bound shipments, both bought by dummy companies, recovered recently in Miami. The other shipment was 42 diesel motors (suitable for tractors) en route to Cuba from Le Havre, France. It is safe to imagine that the loss of these two shipments is a hard blow to Premier Castro who desperately needs to do something about Cuba's failing agriculture.

AC

Hurricane Carla, which did so much damage to the Galveston, Texas, area last month, was responsible for some anxious moments on the part of officials responsible for large chemical plants on the Gulf Coast. Freeport Sulphur Co., for instance, whose facilities all are in Louisiana, shut down four of its five Frasch mines a day or so before the storm arrived, and employees were sent inland for safety — particularly those assigned to Freeport's off-shore mine at Grand Isle, La. These plants were undamaged, however, as were most of the Gulf Coast's plants, and work was soon back to normal.

AC

Look for one of the major pesticide producers to announce the development of a new DDT formulation. The new formulation will be one to which insects cannot develop a resistance.

AC

The Farm Club of New York, a group of New York executives with farming interests, was the subject of a garden column by Barbara Black in the *New York World-Telegram and Sun* last month. The club's membership is made up of 85 business and professional men with offices in the New York area and a collection of farms scattered all over the United States. J. V. Vernon, vice president of FMC, is president of the club. He owns a fruit farm in Pittsfield, Ill. Edward H. Phillips, director of purchasing for GLF, is secretary-treasurer. Ed, who is between farms at the moment, also is editor of the club's *Bulletin*, which is filled with helpful articles on farming topics.

AC

5,250 tons of potash made for one of the longest, if not the largest, trainloads of a single commodity ever moved by the Western Pacific Railroad last summer when a one-mile-long special freight train carried the potash in 75 cars from Wendover, Utah, to Stockton, California, for export to Japan. Called the "Potash Special" the train was the subject of a glowing report in the railroad's internal publication "Mileposts."

molten sulphur

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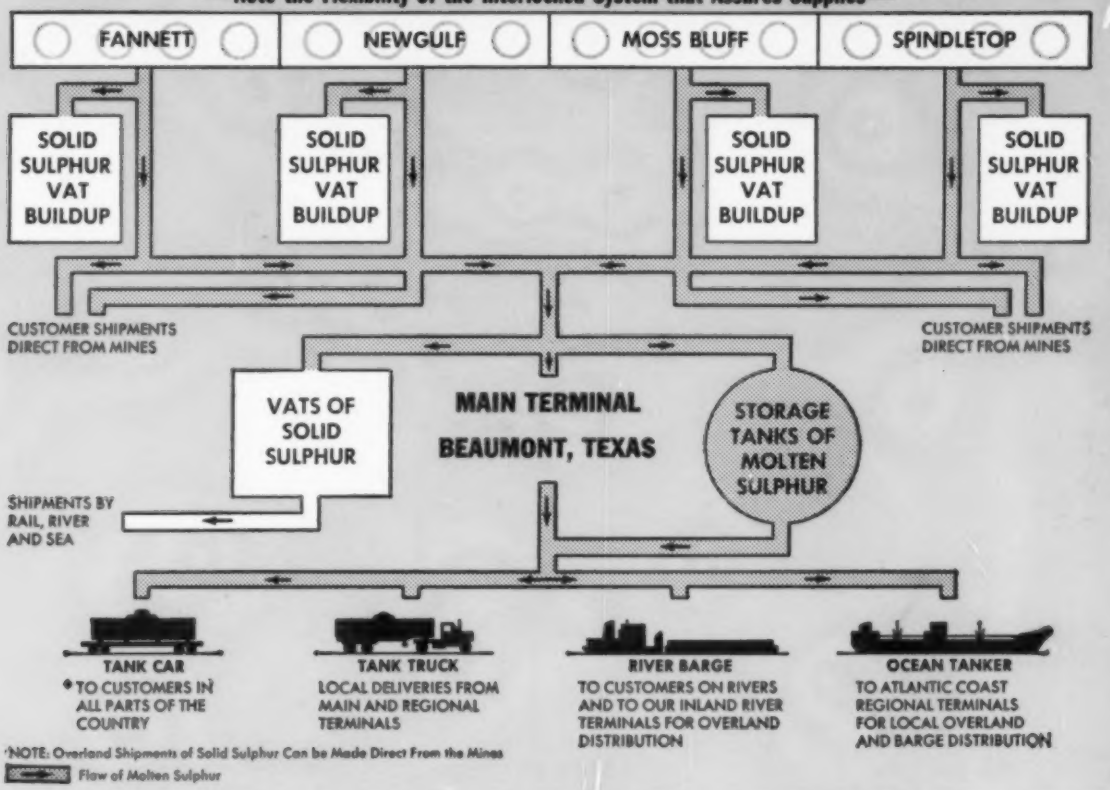

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